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THE HISTOLOGY OF THE THYROID GLAND IN PREGNANCY*

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CHARPENTIER, in his Cyclopædia of Obstetrics and Gynæcology, published in 1887, states: "Goitre in pregnancy is usually benign and should be treated by general measures and internal treatment. Forbid the patient to nurse, and give iodine." Lawson Tait was the first to describe the step-like enlargement of the thyroid gland associated with multiple pregnancies. Von Groff reported 38.5 per cent of thyroid glands enlarged in pregnant women. Davis[1] makes the sweeping statement that thyroid hypertrophy in women either starts as a congenital defect or begins at puberty or during pregnancy. He also states that moderate hypertrophy of the thyroid gland has been accepted as an incident of pregnancy.

An extensive review of the literature reveals no unanimity of opinion as to what happens to the thyroid gland during pregnancy. Most opinions are based upon surmise or theoretical grounds and not upon the actual study of the thyroid gland during pregnancy and careful comparison of their findings with an equal number of what are known to be normal glands.

Roughly, one can divide current beliefs into three schools: (1) that the thyroid gland becomes hyperplastic during pregnancy; (2) that the thyroid gland becomes hypoplastic or colloid in nature during pregnancy; (3) that there is no change in the histology of the thyroid gland. Generally speaking, American observers favour the hyperplastic theory, while Continental workers believe that there is either no change or that the gland becomes colloid in nature.

THE HYPERPLASTIC THEORY

Marine[2] states there is always some decrease in the iodine content of the thyroid gland during pregnancy, and urges the giving of iodine to prevent the hypertrophy that occurs so commonly. He does not state, however, what histological changes in the thyroid gland accompany this hypertrophy. Schwarz,[3] in discussing Davis' paper, stated that he had studied a series of thyroid glands from guinea pigs, removed at various stages of pregnancy. The histological changes were striking. About the end of the first third of gestation there was a marked hyperplasia of the interfollicular tissue with slightly increased storage of colloid. At the middle of gestation the hyperplasia of the interfollicular tissue was even more marked and colloid storage still more increased. During the time that corresponds to between 50 and 55 days of gestation the acini were markedly distended with colloid and the interfollicular tissue was compressed and thinned out. At term, however, the colloid had markedly decreased and the interfollicular tissue had become more prominent, but much less so than in mid-pregnancy. He believed that this thyroid activity might be helpful in speeding up glycogenolysis during this period in order that the fetus might more readily obtain the carbohydrate which it needs so abundantly for the storage of glycogen and fat at this time.

Falls[4] believes that many of the nervous symptoms in pregnancy are due to abnormal activity of the thyroid gland induced by the pregnant state, but offers no proof for his statement. Verdozzi[5] studied the thyroid gland of 20 guinea pigs in different stages of pregnancy, seven after parturition and three unmated. In the first half of pregnancy the gland showed marked activity evidenced by hyperæmia of the tissues and the acini were lined by cuboidal epithelium and full of colloid. In the second half of pregnancy there was no definite hyperæmia, the epithelium was lower, interfollicular islands were scarce,

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and the colloid was hyaline and reduced in amount. Bokelmann and Scheringer[6] found that the blood iodine is already relatively high in the second and third months of pregnancy and keeps rising until the seventh month. Here it remains stationary until the ninth month, when it begins to fall. These investigators also found that by injecting sublethal doses of thyrotropic hormone derived from the anterior lobe of the hypophysis they produced the same changes in the thyroid as occur during pregnancy. In describing these they state that there was a marked increase in the amount of colloid, which completely filled the acini and even intruded into the interacinar spaces. The acini were medium in size or large, and were lined by a single layer of cubical or low columnar cells.

Schettenhelm and Eisler found that injection of adrenalin into a patient with Graves' disease (a disease in which the blood iodine is also high as in pregnancy) caused a marked fall in the iodine concentration of the blood. They found that this also occurred in pregnant women, but that in myxœdematous or normal women there was a marked rise in blood iodine. Scheringer[7] repeated these experiments. He injected 0.005 mg. of adrenalin into each of seven pregnant women between the fifth and eighth month, after previously estimating the amount of blood iodine. He collected samples of blood at 30 seconds, 30 minutes, 1 hour, and 24 hours. He found that there was a marked fall in blood iodine concentration at 30 seconds, and after this that it gradually rose, until at the end of 24 hours it was back to about its normal level. He therefore argued that in pregnancy and Graves' disease the thyroid was in a state of hyperactivity because in both conditions he found a high blood iodine which fell rapidly after the administration of adrenalin.

THE HYPOTHYROID THEORY

On the other hand such authorities as Breitner[8] believe all pregnant women are hypothyroid. Knaus[9] states that the changes in the thyroid gland in pregnancy are to be ascribed to hypofunction. He points out that this is indicated by the increase in granular colloid containing a low iodine content, a decrease in the excretion of water and sodium chloride, nitrogen retention, a decrease in the resorptive capacity of the subcutaneous tissues, and a decrease in the function of the ovaries. This assumption of hypofunction of the thyroid gland is supported by the favourable influence of thyroid preparations on the œdema of pregnancy. Krjlow and Sternberg[10] showed that immediately following coitus in rabbits there was an increase in weight and vascularity of the thyroid, associated with a marked decrease in colloid in the acini. If pregnancy occurred there was a gradual increase in the colloid content of the acini, but not so fast as if pregnancy did not occur. Kraus[11] reports three cases of women dying during pregnancy in whom the histological picture of the thyroid was that of hypothyroidism.

Knaus[12] believes that the thyroid loses its function as an organ of internal secretion during pregnancy and that there is a hyperfunction of the hypophysis. Experimentally, he injected virginal rats for two to four weeks with extract of corpus luteum. On post-mortem examination he found the sex organs enlarged and hyperæmic and the thyroid much heavier. Histologically, there was a marked increase in colloid. From this he also concluded that the corpus luteum causes inhibition of the output of thyroid secretion. The animals gained in weight, which also points to hypothyroidism. Ludolf[13] found that following complete thyroidectomy 10 animals conceived, went through pregnancy normally, and nursed their young. He therefore concluded that the thyroid enlargement which is often noticed in women during pregnancy did not signify any special hyperactivity. Clute and Daniels[14] found pregnancy and hyperthyroidism associated in 0.41 per cent in 3,678 cases, and hence concluded that pregnancy did not appear to be a cause of hyperthyroidism. Mussey, Plummer and Boothby[15] found hyperthyroidism and pregnancy associated in only 0.6 per cent in 7,228 cases and were of the same opinion as Clute and Daniels. Yoakum[16] added further strength to their argument by finding no case of hyperthyroidism in 937 obstetrical cases. Friedmann,[17] after considerable experimental work and a review of the literature, concluded that, at least in the lower animals, thyroid activity was not necessary in pregnancy.

The fact that the basal metabolism rate rises possibly 30 per cent in the last three months of pregnancy does not prove any increased thyroid activity, but is due merely to the increased protoplasmic mass, chiefly the fetus itself. This has been admirably shown by Sandiford and Wheeler,[18] Root and Root,[19] and Garipuy *et al.*[20] Boothby, Wheeler and Sandford[21] have recently confirmed this on a woman previously studied. In their work they find that although the total calories per hour increase to approximately 25 per cent above the normal level toward the end of pregnancy, yet if this figure is divided by the sum of the surface areas of the fetus and the mother there is no appreciable change in the rate of heat production of a unit mass of tissue during pregnancy.

PERSONAL RESEARCH

After reviewing the literature, we began our study of the effect of pregnancy on the histology of the thyroid gland with perfectly open minds. At the very beginning it was obvious that the normal physiological change in the thyroid gland had to be established in this area. This was carried out on approximately 1,000 animals, ranging from youth to old age.[22, 23] While it had previously been shown[24] that in premature and newborn babies the histology of the thyroid gland varied greatly, it was found that heretofore the wide range of physiological variations had not been appreciated and that the histology of the thyroid varied tremendously with age. Hence any research on the histology of the thyroid gland during pregnancy had to be carried out on animals of about the same age. In this particular research problem it was decided to use cows about 2 years old. Through the courtesy of the Harris Abattoir a series of thyroid glands were collected in individual cans containing 10 per cent formalin from 95 non-pregnant and 103 pregnant cows. The veterinary surgeon present estimated the duration of pregnancy by the development of the fetus. The two series of glands were then blocked, sectioned and stained in exactly the same manner as in all our previous work.[22 to 25] Each microscopical section was studied in routine fashion, definite information being tabulated as to colloid content, vacuolation, cell type, tufting, presence of lymphoid tissue, amount of stroma and vascularity. In all these, with the exception of cells, we used the plus and minus system to designate the grade.

Colloid.—As colloid is normally present, we made xx the normal; 0 represented complete absence, and xxxx great distension.

Vacuolation.—In this, too, 0 represented complete absence. When any vacuolation was present it was graded x, xx, and xxx.

Cells.—These were classified finally into three major groups, flat, cubical and columnar. A cubical or low cuboidal cell was considered normal; a flattened cell or columnar cell was considered abnormal.

Tufting.—Tufting was graded x, xx, xxx, xxxx plus, according to the degree present.

Lymphoid tissue.—This was found in so few animals that its presence was merely noted.

Stroma and vessels.—In this case we marked the normals as 0. If less than normal, it was classified -, --, ---, ----, etc., according to the degree of compression. If more than normal, it was classified x, xx, etc., according to the amount of increase.

After a careful study of each section with regard to the above components, we classified them as colloid, normal, or hyperplastic glands. In classifying glands as normal we found a moderately wide range in cell type, stroma, and vascularity which we considered normal. Marine states that any gland in which the cells are higher than low cuboidal is hyperplastic, but our own observations do not support this view. We divided our normals into two types. (1) Normal resting.—These are characterized by low cuboidal epithelium, well-marked colloid distension, and a stroma and vascularity of no great prominence. (2) Normal active.—In these glands the cells are cubical, the colloid content is normal or slightly less than in the normal resting state. The greatest difference is in the interacinar stroma. This was well marked and contained numerous moderately distended vessels, giving the whole gland a very vascular active appearance. These glands appear to be in a transient state, either progressing from a normal resting to a hyperplastic stage, or reverting from a hyperplastic stage to the colloid stage. Whether progressive or regressive, we consider this a normal physiological phase and not pathological. The glands that were considered hyperplastic were classified as 1-2-3-4 plus, according to the type of cell, amount of tufting, and paucity of colloid. On the other hand, those glands that showed flattened epithelium, increased colloid, etc., were graded 1-2-3-4 colloid, according to the degree of change.

We first examined and classified the 95 sections from non-pregnant cows and then having obtained a clear-cut picture of what is actually found in them, we examined the 103 sections from the 103 pregnant animals. Tables I, II and III show our results in tabulated form. In

TABLE I.

	Group A		*Group B*		*Group C*	
	Non-Pregnant	*Per cent*	*Pregnant*	*Per cent*	*Ordinary*	*Per cent*
Glands examined	95		103		68	
Normal resting..	62	65.3	42	40.0	34	50.0
Normal active...	11	11.6	29	28.1	16	23.4
Colloid glands:						
x.....	6	6.4	6	5.8	8	11.6
xx.....	0		2	1.9	0	
xxx.....	0		0		0	
xxxx.....	0		0		0	
Hyperplastic glands:						
x.....	12	12.6	15	14.5	7	10.2
xx.....	3	3.1	8	7.7	2	2.6
xxx.....	1	1.0	1	0.9	1	1.2
xxxx.....	0		0		0	

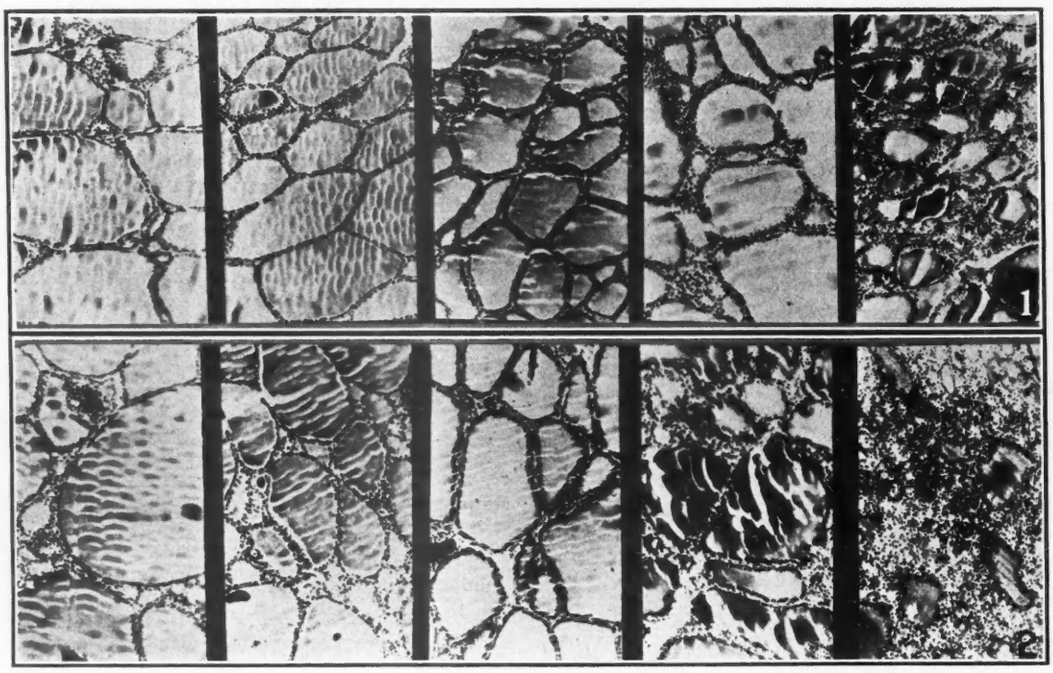
TABLE II.

	Non-Pregnant	*Per cent*	*Pregnant*	*Per cent*
Glands Examined....	95		103	
Amount of colloid:				
0.....	0		0	
1.....	6	6.3	7	6.8
2.....	66	69.4	51	49.5
3.....	23	24.3	36	34.9
4.....	0		9	8.8
Vacuolation:				
0.....	83	87.4	72	69.9
1.....	8	8.4	24	23.3
2.....	4	4.2	6	5.9
3.....	0	0	1	0.9
Cell type:				
Flat.....	5	5.3	12	11.6
Cuboidal.....	71	74.7	70	67.9
Columnar.....	19	20.0	21	20.5
Tufting:				
0.....	87	91.7	82	79.6
1.....	5	5.2	18	17.6
2.....	3	3.1	2	1.9
3.....	0	0	1	0.9
4.....	0	0	0	
Amount Stroma:				
−3.....	0		0	
−2.....	0		3	2.9
−1.....	7	7.4	4	3.8
0.....	44	46.4	32	31.1
+1.....	32	33.6	44	42.8
+2.....	12	12.6	19	18.5
+3.....	0		1	0.9
Vascularity:				
−3.....	0		0	
−2.....	0		1	0.9
−1.....	7	7.4	3	2.9
0.....	57	60.0	41	39.8
+1.....	26	27.3	32	31.1
+2.....	5	5.3	23	22.4
+3.....	0		3	2.9
Lymph tissue:				

Table I we have also included our original figures published before from animals taken, without knowledge as to whether they were pregnant or not.

It will be noted that in all three groups, non-pregnant (A), pregnant (B), and the unknown group (C), the majority of the glands were classified as normal in 76.9 per cent in group A, 68.1 per cent in group B, and 73.4 per cent in group C. However, basing our percentages on all glands examined, 28.1 per cent of the glands were classified as normal active in group B, against 11.6 and 23.4 in groups A and C respectively. If pregnancy does activate the thyroid gland the number of active glands in group C, in which undoubtedly many pregnant animals were included, should be higher than that in A and lower than the percentage in B, just as was found. In group A 6.4 per cent were classified as colloid goitre, 7.7 per cent in group B, and 11.6 per cent in group C, not coinciding with our previous finding but based upon about eight animals in each group. The remainder were classified as hyperplastic, 16.7 per cent in the non-pregnant group (A), 22.1 per cent in the pregnant group (B), and 14 per cent in group C.

Figs. 1 and 2 represent the histological variations found in non-pregnant animals (A) and in pregnant animals (B). It is quite apparent from a study of these two series of microphotographs that there is no striking difference in the two groups of animals. Tables II and III represent in tabloid form the comparative minute histology of the non-pregnant and pregnant group. These Tables are self-explanatory, and there is a marked similarity between both groups, with few exceptions. One or two points are, however, worthy of note. An excessive colloid content in the acini was present in pregnant animals in 43.7 per cent compared with 23 per cent in the non-pregnant. This is a point against hyperplasia. On the other hand vacuolation, a definite sign, in our opinion, of activity, was present in 30.1 per cent of pregnant animals, as against 12.6 in non-pregnant, a point in favour of overactivity. The type cell found was practically identical. Tufting was again another definite evidence of activity higher in the pregnant animals, being present in 20.4 per cent of the group in comparison with 8.3 per cent in the non-pregnant group. In Table II it will be noted that there was an increase in stroma in 61.3 per cent of pregnant animals, in comparison with 44 per cent in non-pregnant animals. This is again in favour of hyperactivity. Vascularity also was increased in the pregnant group as compared with the non-pregnant group, being present in 56.4 per cent and 31 per cent respectively.



We have also endeavoured to trace any change in the thyroid at various periods during pregnancy. Table III shows in tabloid form the histological classifications from one to nine

months. Schwarz[3] reported, following an investigation of guinea pigs, definite changes during pregnancy. During the first half of pregnancy he found a gradual increase in the interfollicular tissue together with an increase in colloid. For a short period following this the colloid kept on increasing, but the interfollicular tissue became compressed and thinned out. Toward term there was again an increase in the interfollicular tissue together with a rapid loss of colloid. Verdozzi[5] found a marked increased activity in the first half of pregnancy, characterized by marked interacinar hyperæmia and some increase in colloid, associated with cubical epithelium. In the second half of pregnancy the interacinar tissue became less marked, the epithelium lower, and the colloid lessened. Bokelmann and Scheringer[6] state that during pregnancy there is a marked increase in the amount of colloid associated with cubical or low columnar cells. Krjlow and Sternberg found an increased vascularity with loss of colloid in rabbits following coitus. This was followed by an increase again in colloid—more so if pregnancy did not occur. These statements are so much at variance that no conclusion of any value can be drawn. Certainly from Table III, based upon five times as many animals and well-controlled observations, no definite conclusion can be drawn. Further work on a larger number of animals must be done on this particular phase of the subject.

TABLE III.

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*Final analysis of preg. animals*	*Final analysis of non-preg. animals*
Colloid											
4....	..	..	..	..	..	..	..	..	..	0	..
3....	..	..	..	..	..	..	..	..	..	0	..
2....	1	..	..	..	1	..	..	..	..	2	..
1....	..	1	1	2	..	1	..	1	..	6	6
0....	..	..	..	..	..	..	..	..	..	0	0
Hyperplastic											
4....	..	..	..	..	..	..	..	..	..	0	0
3....	1	..	..	..	..	..	..	..	..	1	1
2....	..	4	..	..	1	1	1	..	1	8	3
1....	5	4	3	..	3	..	..	..	..	15	12
Normal activity	2	7	1	3	3	6	1	5	1	29	11
Rest...	5	10	14	5	2	2	1	1	2	42	62
	14	26	19	10	10	10	3	7	4		
Colloid	7.2	3.8	5.3	20	10	10		14.3			
Hyperplastic	42.8	30.8	15.6	..	40	10	33.3	..	25		
Normal activity	14.3	26.9	5.3	30	30	60	33.3	71.4	25		
Resting	35.7	38.5	73.8	50	20	20	33.3	14.3	50		

DISCUSSION

As we[25] have already pointed out, one must give the thyroid gland a much wider range of physiological variation than has heretofore been done. This is the first and greatest basic fact on which we must judge the changes found in the thyroid glands of pregnant animals. The statement by many investigators that the thyroid gland is enlarged in about 30 per cent of pregnant women to our minds is of no clinical value whatever. Two years ago, one of us, in going over the records of 778 university girls from all parts of western Canada, ranging from 14 to 37 years of age, obtained some interesting information. Of 778 girls examined, 480 were classified as normal and 256, or 32.9, had enlarged thyroids, were under treatment or had had their thyroids removed. The work was done to follow up a large survey on children in the public schools in which it was shown that there is a progressive increase in the incidence of enlarged thyroids in girls up to high school age. It is therefore valueless to report the number of thyroid enlargements during pregnancy unless is given at the same time the size of the gland previous to the onset of pregnancy.

The greatest amount of evidence in our research points to a slight increase in activity of the thyroid during pregnancy, purely physiological in character. We base this assertion upon a slight increase in the number of active glands found in pregnant animals in comparison with non-pregnant animals. In addition we found vacuolation more frequent in pregnant animals (30.1 per cent) than in non-pregnant (12.6 per cent), and tufting, stroma, and vascularity were all increased in greater percentages.

Mayo and Plummer state that a supply of iodine inadequate for the proper functioning of the thyroid gland followed by a subnormal delivery of thyroxine to the tissues produces hypothyroidism. Consequently there is an increased thyroid stimulation, causing diffuse hypertrophy of the thyroid gland; the secretory processes are altered, the diffuse hypertrophy disappears, colloid is stored in excess and diffuse colloid goitre results. Hinton[26] and Frazier and Ulrich[27] offer this explanation for the thyroid enlargement during pregnancy.

Are they not attributing to pregnancy what is really a simple iodine deficiency?

SUMMARY

1. A review of the literature as to the effects of pregnancy on the thyroid gland leaves one with no definite proof of any pathological change.

2. In our opinion, any statement as to an actual enlargement of the thyroid gland during pregnancy must be accompanied by positive knowledge of the condition of the gland before the onset of pregnancy.

3. We have shown that over 30 per cent of young women in our district have enlarged thyroid glands before pregnancy has taken place. This corresponds very closely to the number reported as being enlarged during pregnancy.

4. One must clearly differentiate between enlargement due to lack of iodine and enlargement due to pregnancy. The basic factor is probably a lack of iodine.

5. Our findings, based upon a series of 103 animals of similar age at various stages of pregnancy carefully compared with 95 non-pregnant animals of similar age, point to mild increased physiological activity.

6. This increased physiological activity is more pronounced in the earlier months of pregnancy.

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THE PRAIRIE DOCTOR.—"Let it not be thought that 'the Old West' is wholly gone. So long as hardship, valour and sacrifice remain on these plains, one likes to think that at least a 'hangover' of the Old West is with us still. Consider doctors in Saskatchewan rural areas in the late, almost perhaps unprecedented, spell of sub-zero weather—six weeks of it—with the temperature going to 54° below zero in Regina and to more than 60° below in a number of parts of the province. Through all this bitter weather, and, with it, frequently blizzards and badly drifted roads and trails, the country doctor has carried on. Bundled and muffled to the eyes, he has taken to cutter or team, automobile or snowmobile, and with unflinching spirit ridden forth, sometimes in the middle of the night—an 'awful night' to be sure—to minister to someone in danger or pain. Sometimes it has been to bring a new Canadian into the world, sometimes to perform an emergency operation. He has gone to isolated hamlets and to little white houses still standing up bravely in these days on the bald prairie. The 'country doctor' still means something in Canada. Here in the West romance and a stout willing heart still invest such a figure. Such a one came back into Ogema, Saskatchewan, the other day after a 52-mile trip in the open. It was a one-day contribution to health and security. The West may be emerging from its pioneering stages, but it is not by any means emerging from the qualities displayed by earlier generations here, nor from the need of continued exercise of those qualities. The rural doctor in the West has been an integral part of the West's story. His record will be found in the chapters on high courage."—Editorial from the *Regina Leader-Post*.

HYPERTROPHY OF THE PALPEBRAL TARSUS, THE FACIAL INTEGUMENT AND THE EXTREMITIES OF THE LIMBS ASSOCIATED WITH WIDESPREAD OSTEO-PERIOSTOSIS: A NEW SYNDROME*

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ABOUT ten years ago a patient consulted me for a condition of the eyelids, which seemed to be a hyaline or amyloid tarsal degeneration. Examination revealed that we had to do rather with a keloid hypertrophy. It was clearly a palpebral condition not previously described. Besides this thickening of the eyelids, the patient had a hypertrophy of the integuments of the face and the extremities of the limbs. And, finally, he suffered from a bony lesion the exterior aspect of which reminded one of acromegaly. However, radiography permitted me to make a diagnosis as well of a generalized osteo-periostosis affecting almost all the bones of the skeleton. This particular condition I shall describe in greater detail in a future communication. I had here to deal with an atypical cutaneous and bony disease, probably caused by the same endocrine trouble responsible for the palpebral hypertrophy.

CASE REPORT

On April 21, 1925, R.L., a male, 37 years of age, consulted me for his eyelids. He said that until 15 years previously his eyes and eyelids had always been in a perfect condition. At that time he was operated on for two chalazions in the upper eyelids. At the age of 20, when occupied in the manufacture of maple syrup in a forest cabin, he had a considerable irritation of the conjunctivæ characterized by marked hyperæmia, itching, epiphora and photophobia. At the beginning of the fall of the same year he noticed that his superior palpebræ, which had always been very supple until then, became stiff. Later, it seemed to him that they were thicker than usual. In process of time the disease increased very slowly, and it was only at the age of 23 years that he observed the same manifestation in the inferior palpebræ. It must be emphasized that these symptoms appeared simultaneously in the case of the upper eyelids, and three years later in the lower eyelids. During the subsequent years the palpebral hypertrophy progressed in a symmetrical and hardly perceptible manner. This hypertrophy caused in time a drooping of the superior palpebræ, and the visual field, in consequence, became diminished. However, direct vision always remained good.

On examination I observed a double ptosis covering more than half of the ocular globes. The upper eyelids were very much thickened, especially in the ciliary fields, and particularly in the external canthi. They were rigid, and, in this situation, were no longer in contact with the eyes, which they protected after the manner of a penthouse. In everting them I found that the mucous membrane of the fornix, though congested, did not present any trachomatous lesion. Nevertheless there existed numerous deep fissures, nearly vertical in direction, throughout the tarsus, giving it an irregular appearance, and separating ridges or hard nodules which had the consistence of cartilage. The conjunctiva was quite adherent to all of this hypertrophied tissue. Measurement of the superior palpebræ gave an average of 6.50 cm. in breadth, 3 cm. in height, and 1.25 cm. in thickness up to 1.50 cm. in the mammillated portion of the external canthi, which were not in contact with the eyeball. The lower lids were equally increased in volume, but remained in contact with the eyes. (See Fig. 6, taken in 1925).

From the beginning of his disease the patient complained of a marked permanent conjunctival catarrh, with a slight epiphora. However, the lachrymal ducts were permeable. The skin of the eyelids contained numerous telangiectatic blood vessels, more or less tortuous, producing a violet colour. There was a slight loss of the eyelashes. Refraction showed the patient to be emmetropic, and that his vision was good. The pupils reacted well to light. Perception of colours was normal, as well as the visual field, which was taken after having raised the upper lids as far as possible. Since the fundus of the eye showed no lesion, the corneæ were transparent and sensitive, accommodation was excellent, and there was no diplopia, I concluded that I had to do with an affection which was entirely palpebral. However, the problem proved much more complex than that, because, on continuing the examination, it was evident that my patient suffered from a generalized disease. The size of his head was greater than normal; the skin of his pachydermic face fell into grooves, one cm. in depth; his wrists and ankles were enormous; and the digits of his hands and feet were short and very thick.

As the nasal pyramid was abnormally developed, I practised anterior rhinoscopy. The nostrils were free, and the septum was rectilinear, without thickening. The cartilages not being increased in volume, I had then to do with a hypertrophy of the skin of the nose and of the subcutaneous cellular tissue.

The tongue, the pharynx and the rhinopharynx were normal. From the age of 15, the patient suffered from dental caries, and at the time of examination he had only 22 teeth. Of this number 20 were filled. By transmitted light I observed that the frontal sinuses were particularly large. The conchi of the ears presented

* This mémoire, finished in December, 1934, was sent to the "Académie de Médecine de Paris", on January 30, 1935. Upon acknowledgment of its receipt, I addressed to the Secretary, one month later, a letter on this subject. I have read in No. 92 of *La Presse Médicale*, dated November 16, 1935, page 1820, an article by M.M. A. Touraine, G. Solente and L. Golé, entitled: "Un syndrome ostéo-dermopathique: la pachydermie plicaturée avec pachypériostose des extrémités". I declare here that since then I have not changed anything in my text, and that I am publishing my paper as presented to the "Académie de Médecine de Paris".

nothing worthy of note, and the hearing was very good on both sides. The pre-auricular, sub-maxillary and cervical glands, were not enlarged. The thyroid showed no abnormality.

The thorax was well developed and normal. The hairy system throughout the body was absolutely normal, with the exception of a slight madarosis. Of a strong physique and well proportioned, the patient measured five feet, seven inches, and weighed 160 pounds. He had always been very nervous and irritable, and declared spontaneously that he did not like to be annoyed. I asked him a few questions about his hereditary and personal antecedents which, he could not, at this time, sufficiently answer. He permitted no further examination, and went home.

In 1931 I saw him again, and he could then furnish me very interesting information. His maternal grandmother died with a goitre. His mother, as well as three maternal aunts, had hypertrophied thyroid glands. Two of his sisters were also goitrous. The other members of his family showed nothing abnormal in the region of the neck. Also, I learned that in the locality inhabited by his ancestors, and the surrounding places, there had always been many persons affected with goitre. It seems there was no syphilis nor tuberculosis in his ascendants. He was the only one to suffer from his eyes.

No forceps had been used at his birth, although it had been difficult. His weight was nine pounds. It was only at the age of three years that an exaggerated development of the skull and extremities was noticed. This pathological condition increased very slowly. No convulsions occurred during infancy. At the age of 18 the wrinkles of the face began to appear. Towards 22 years, however, the bony hypertrophy ceased, for since 1910 the patient had worn the same size of hat and the same ring on his finger.

I made two biopsies of the sub-conjunctival tarsal tissues of the upper lids, in the region of the external canthi, from the most prominent parts which did not have any contact with the eyeballs. I owe to the courtesy of Prof. Pierre Masson the following anatomo-pathological report.

"The two biopsies present the same aspect; they are two small oblong masses measuring 1 cm. in length by 4 mm. in diameter, formed by a very firm tissue, white and fibrous in appearance. After fixation with Bouin's picric formol, each piece was transversely divided into many portions which were impregnated with paraffin; the others were cut after hardening or treatment with osmic acid. The histological study of these various portions showed lesions exactly similar, both in the right and in the left, but of variable appearance, the description of which is as follows.

"In certain regions we found, especially in the neighbourhood of the palpebral border, Meibomian glands with intact secretory *culs-de-sac*, but with enlarged excretory ducts. At the side, we found small cysts covered by a thick epidermoid epithelium, in which are enclosed masses, or bands of sebaceous cells of spongy structure, other cysts with a purely epidermoid covering, but reduced to one or two layers of flat cells, others finally unprovided with epithelium, and limited only by a fibrous shell. (See Fig. 1).

"All these cavities were filled with an atheromatous mass in which albuminous granulations, neutral fats and some double refractile crystals are mixed together. The intervals between these degenerated glands were composed of a connective tissue in the form of large collagenous bundles between which are found small masses, or discrete, lympho-plasmocytic bands.

"Other cavities filled up with the same atheroma were bordered by a layer formed of giant cells and macrophages, resting on the fibrous shell and taking the place of the old epithelium. In others the giant cells insinuate themselves farther and farther into the central granulo-fatty pulp, and form festoons around it. Elsewhere, they become more and more numerous, and divide the original atheromatous plate into smaller and smaller masses. One stage farther on, and in the place of the former cyst, we found a spherical mass formed by a multitude of giant cells included in a fibrous shell. (See Fig. 2).

"Out of these clumps which had preserved the dimensions and the form of the cyst for which they had been substituted groups of giant cells were found surrounding small fatty masses, isolated one from the other by a less dense fibrous tissue spotted with inflammatory deposits. These bands were polymorphic, and included macrophages with one or two nuclei, filled up with albuminous deposits of a filamentous or leaf-like aspect, with droplets of neutral fats, and of small fatty acid crystals, macrophages of small size, plasmocytes, and *Mastzellen*.

"In certain regions the giant cells are lacking and the polymorphous inflammatory bands, very poor in fat inclusions and separated by large collagenous bundles with very delicate fibrils, alone persisted. The fixed cells were found between these bundles, and not in their interior.

"If we may orientate the more or less confused lesions which are revealed in our microscopic preparations, we arrive at the conclusion that they represent the stages of the same process which the Meibomian glands have successively reached. At the beginning these glands have undergone a cystic dilatation, with degeneration of the secretory elements which have converted them into milia. From this stage, a histiocytic reaction has been established by contact with them. The epithelium undergoes atrophy and disappears when the histiocytes, which have passed into the cyst, resorb its contents. The resorption ended, the phagocytic cells are rarefied, and an exuberant cicatricial mass, poor in fixed cells, and rich in fundamental substance, similar to a cheloid acne, alone persists. This fundamental substance did not present the homogeneous appearance of amyloid or hyaline material. The search for amyloid deposit by the Paris violet, iodine and Congo-red stains was quite negative.

"Summing up, we have to do with a progressive degeneration of the Meibomian glands, the remains of which determined the production of foreign body granulomas, and a cheloid hyperplasia of the tarsal conjunctival tissue."

Desiring to complete his anatomo-pathological report, Prof. Masson asked me to give him another biopsy of the tarsus, this time covered by the conjunctiva. A few months later, I furnished him the piece he required, on which he reported:

"The portion removed was cut perpendicularly to the surface of the conjunctiva, and at the palpebral border. It contains on the surface a Malpighian stratified epithelium, almost everywhere of mucous type, with a cylindo-cubic surface only in the neighbourhood of its superior limit. Here and there this covering presented small islets of cells of keratohyalin, covered with keratinized cells. Everywhere this epithelium was bordered by spongiosa, and penetrated by numerous polymorphonuclear cells in diapedesis. Throughout we found conjunctival glands, sometimes normal, sometimes dilated, and more or less cystic.

"Immediately underneath the surface, and round about the glands, the superficial layer presented a lymphocytic and, especially, a plasmocytic infiltration in sheets. Here and there the infiltrating elements were in rounded masses, follicular in appearance, and formed either of lymphocytes or of plasmocytes. Under this infiltrated layer was found a mass of fibrous conjunctival tissue of cicatricial appearance, slightly œdematous, which formed the greatest part of the removed tissue. There is no clear limit between the infiltrated superficial layer, and this fibrous tissue which is invading and forms a continuation the one

with the other. The inflammatory infiltration progressively becomes less marked from the surface towards the depth, where it entirely disappears. This deep region, moreover, is remarkable for the number and considerable size of the arteries and veins.

"This deeper portion presents the greatest structural analogy with the appearances in the first tissue removed. As in the former case it corresponds to a hyperplastic sclerosis in relation with the chronic inflammation of the surface. But we are quite unable to determine the etiology of this inflammation."

As I presumed that it would be interesting to have a histo-pathological report on the hypertrophied skin of the patient, I made a biopsy on the forehead, in the middle between the eyebrows, and entrusted it again to Prof. Masson.

"The fragment of the skin removed by biopsy measured 5 mm. in thickness, and included in its

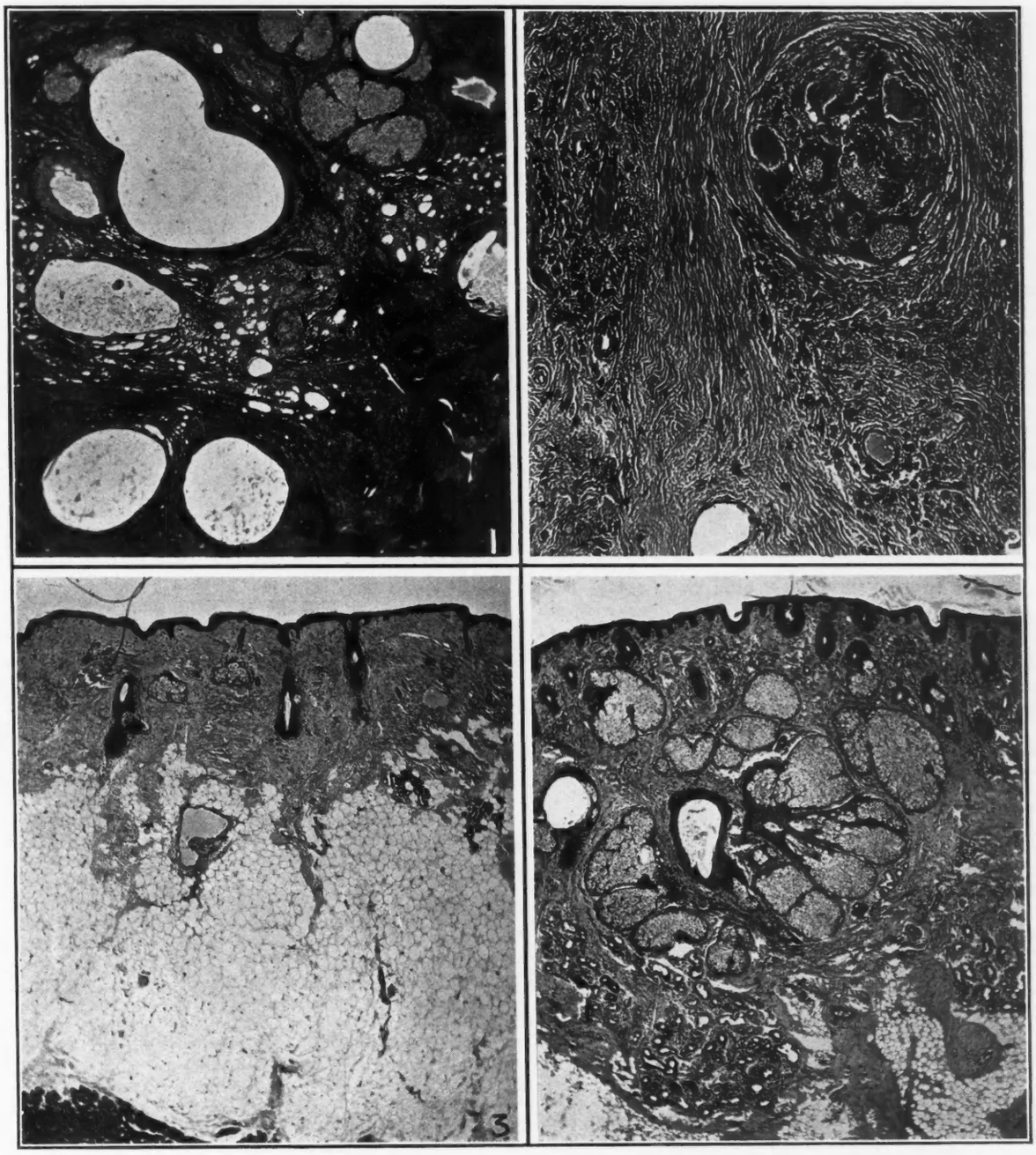

Fig. 1.—Early stage of cystic sebaceous glands; conjunctival tissue is infiltrated with macrophages invisible under this magnification. **Fig. 2.**—More advanced stage. A group of giant cells containing remains of a degenerated sebaceous gland, completely destroyed; to the left of this mass a fibrous band, and on both sides of it, columns of macrophages with fatty inclusions. **Fig. 3.**—Section of the normal skin in the frontal region (low power). Above, the dark wavy line represents the epidermis; beneath, in gray, the derma, where hair follicles are found, cut obliquely. Between the two follicles on the left are two multilobed sebaceous glands; to the right, quite close to the derma, two sudoriparous glands. **Fig. 4.**—Hypertrophied skin of the patient (same magnification). The epidermis has given rise not to 3 but to 17 well-defined hair follicles. Numerous deep projections having the appearance of elongated epidermic papillæ are probably rudimentary hair follicles. At the left and towards the middle of this figure are the sections of two large hair follicles. Around them, or isolated in the derma, we recognize gigantic and multilobed sebaceous glands. In the deeper part of the derma, four or five times thicker than normal, are three groups of sudoriparous tubules. The middle one presents forty divisions, and its duct is clearly enlarged.

depth only an insignificant layer of the panniculus adiposus. The firm and compact tissues which formed it completely seemed, at first sight, to be constituted by the epidermis and a derma four or five times thicker than the normal skin of the frontal integument. (See Fig. 3).

"On microscopic examination, under a low power, this impression was modified slightly. The thickening of the derma is due less to a definite increase of its connective tissue than to the number and size of the epidermal derivations which have developed there in excess and have encroached on the deeper portion.

"The epidermal layer presents only a scanty covering for the papillæ. There are pilo-sebaceous follicles closely packed together, with, here and there, the excretory ducts of the sudoriparous glands. The hair follicles are broad and short, their bulbs scarcely extending beyond the middle zone of the derma. Their hairs are pigmented and implanted more or less obliquely. (See Fig. 4).

"The sebaceous glands, of varying size, but most often large, occasionally multilobed and gigantic, are closely related to them. Certain of these sebaceous follicles are four and five times greater in linear dimensions than those of the normal skin of the forehead. A number of follicles present slight inflammatory lesions, with lymphoid and plasmocytic infiltration of the connective tissue which surrounds them. Certain of them have disappeared and their place is marked by nodules with giant cells. Immediately beneath this derma, thickened by the excessive development of the pilo-sebaceous follicles, we find a layer, 1.5 mm. thick, which corresponds topographically to the superficial region of the subcutaneous layer, but the fatty tissue is scanty; it is replaced by enormous sudoriparous glomeruli separated from each other by their cellular and fatty partitions.

"The secretory tube of these glomeruli is so long and so convoluted that in certain preparations it was cut across twenty, thirty, and even forty times; here and there it shows branching. Its diameter is enlarged; the cells which constitute it are abnormally large, tending to be heaped up in two or three layers; and the deformed secretory lumen assumes a wavy appearance. The secreting cells do not present any structural anomaly, except for the frequent presence of two or three nuclei, probably signs of amitotic multiplication. Nowhere do we find mitosis. Finally, in some glands the intermediate segment which connects the acinus and the excretory duct is distended, manifestly from obstruction. (See Fig. 5).

"The deep derma, the panniculus adiposus between the sudoriparous glands and beneath them, as well as the regional nervous filaments, are infiltrated with a trifling œdema but one which is strongly albuminous, without exudation of cells, which the lesions of folliculitis, as it is very superficial and very distant, cannot explain."

Drs. R. Amyot and H. Gélinas, physicians to the Notre-Dame Hospital, have kindly furnished me the following clinical notes.

"*General physical examination.* — Condition good. The heart and the lungs normal. Arterial pressure 130/80, as a rule. The liver and the spleen are of normal size.

"The head, which is more developed than usual, had not enlarged for many years. The tongue was of a normal size. No inferior prognathism. The thyroid gland was not hypertrophied.

"A painless hydrarthrosis of the left knee was present. The liquid withdrawn was sero-fibrinous.

"The secondary sexual characters were normal. Genital functions normal. Mental state normal. Neurological examination, negative.

"Apart from the organs and viscera, the clinical examination disclosed certain pathological changes, and it was particularly in the face and limbs that the signs were manifested. The skin of the face was thickened, the wrinkles were numerous and very deep, and the eyelids offered this anomaly, which, from the ophthalmological point of view, constitutes the subject of the present work.

"The distal parts of the four limbs, comprising the lower third of the fore-arms and legs, the wrists and hands, the ankles and feet, are the seat of a symmetrical hypertrophy of considerable degree. This increase in volume enlarged the transverse diameter of these structures, and thickened considerably the feet and hands and

Fig. 5.—High power view of sudoriparous tube; hypertrophied skin of the patient. The lumen is large, bordered by cells of unequal size. Some swollen and bulky cells contain two or three nuclei. To the left are two capillaries.

their respective digits. It also involved the nails which were enlarged and had the shape of a watch glass. (See Figs. 6 and 7.) The skin was dry and inelastic and the fingers were thick and stumpy. The thighs and arms were not increased in volume. The temperature of the limbs was normal. No incurvation of the legs."

"*Laboratory examinations.*—The Wassermann test was negative. Urine normal. Urea 0.35 centigr. per 1,000 c.c. Calcium of the blood, 0.106. Cholesterol in the blood, 1.97 g. Phosphates, 34.21 mg. Basal metabolic rate, + 2 per cent.

"Provoked glycæmia.—1.12 gr. fasting. 1.42 gr. after ½ hr. 1.30 gr. after 1½ hr. 1.10 gr. after 2½ hrs.

"The amount of the ionized calcium was 17.09 mg. to the litre. (Formula, Rona-Takahashi).

"To sum up, the chemical and serological examination of the blood did not show anything abnormal, other than a pronounced diminution of the ionized calcium.

"Blood picture.—Red corpuscles, 4,000,000; leucocytes, 16,000; globular value, 0.9; polymorphonuclear cells, 52 per cent; large mononuclears, 5 per cent; lymphocytes, 26 per cent; lymphocytes of medium size, 11 per cent; metamyelocytes, 3 per cent; myelocytes, 2 per cent; basophiles, 1 per cent.

"The morphological examination of the blood showed a leucocytosis of moderate grade, with predominance of the mononuclears."

It would have been interesting to try interferometry; however, the patient was of the opinion that our re-

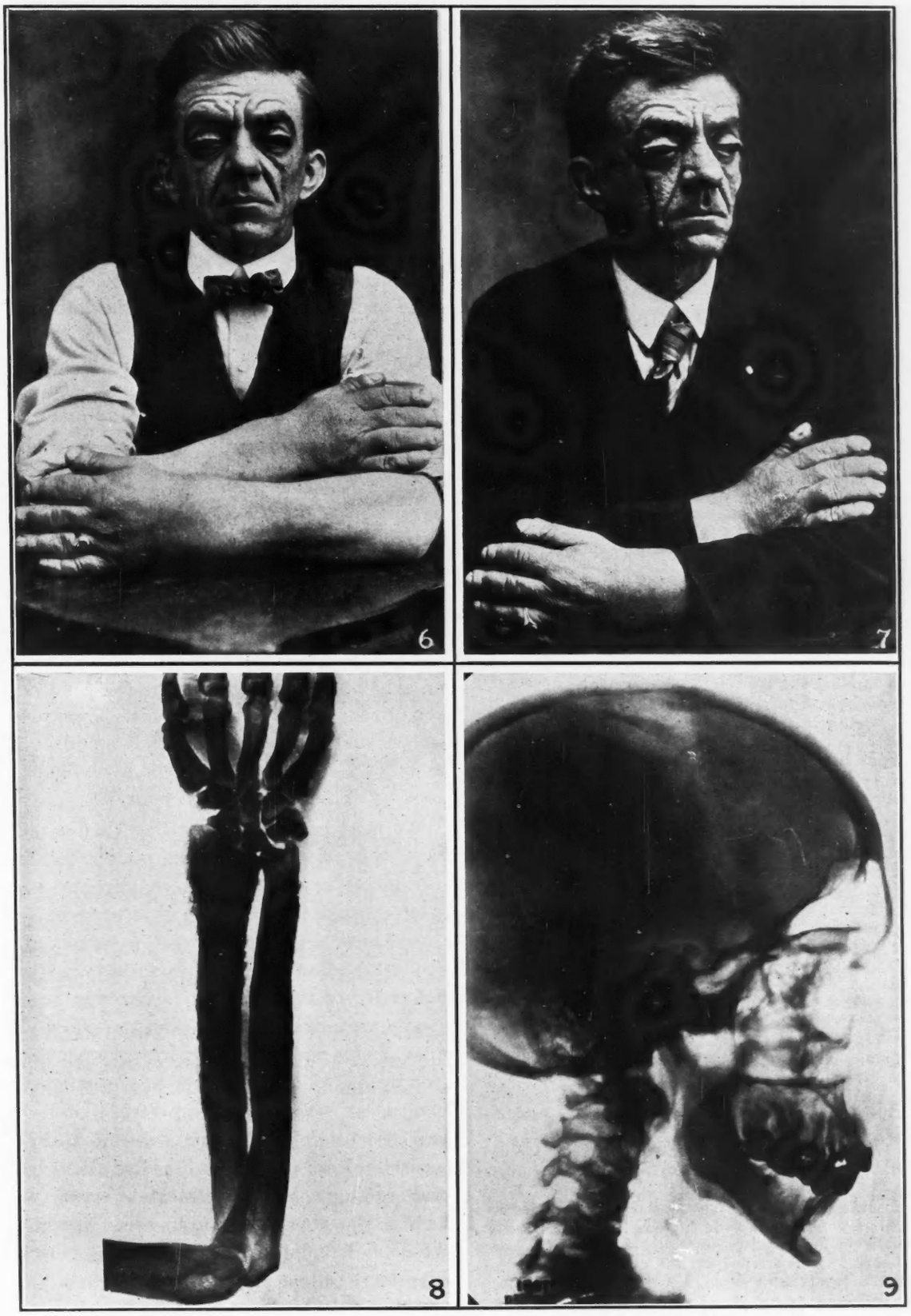

Fig. 6.—Bilateral and symmetrical hypertrophy of the tarsi. Fig. 7.—Bilateral and symmetrical keloid hypertrophy of the tarsi. Fig. 8.—Right ulna and radius. Fig. 9.—Increased thickness of the cranial walls, enlarged frontal sinuses, and a normal-sized sella turcica.

searches were sufficient, and refused to permit us to take any more blood.

We have had radiograms taken of the bony system, and have obtained some extraordinary pictures of quite unusual interest. Dr. A. Jutras, radiologist to the Radium Institute, has been good enough to furnish me with the radiological report.

"The long bones of the limbs are enlarged in their transverse diameter, especially at their distal extremities. The medullary canal has lost a little of its contrast, and encroaches in certain places on the compact bone. This latter is more delicate than normal and presents the appearances of fibrous degeneration; it has lost its usual homogeneity, and has assumed a reticular aspect, with meshes of unequal dimensions, somewhat elongated, and with the long axis roughly parallel to the axis of the bone. The outline of the bones is irregular, nodular, and with osteophytic outgrowths in certain regions, owing to an ossifying hyperplasia which envelops the bone from one diarthrodial cartilage to the other, including the extra-articular part of the epiphysis. Sometimes the peripheral outline is reduplicated, suggesting a bridge, and allowing us to assume the existence of an ossification of the periosteum.

"This general description, indicating resorption and calcareous regeneration, applies to the upper limbs, the collar-bones, the humerus, the ulna, the radius, the metacarpals and the phalanges. In the case of the lower limbs, it applies to the femur, the tibia, the fibula, the metatarsals and the toes. Moreover, certain epiphyses, such as the inferior epiphyses of the two ulnas, are the seat of a hypertrophy of bony spongy tissue. (See Fig. 8).

"Nor have the bony girdles and the short bones of the limbs been spared. The shoulder-blade has irregularities of contour and its trabecular structure is destroyed. The iliac bones, less affected than the other segments, do not present however a perfectly normal shape, especially in the sub-cotyloidian regions and below the anterior and inferior iliac spines.

"The antero-posterior projection of the patellæ presents a woolly aspect and an enlargement of its different diameters by a multitude of small exostoses. Here, as elsewhere, the profile view suggests an extra-articular localization of the hyperostosing process. The carpal and the tarsal bones also present asperities on their extra-articular surfaces. The periphery of the nails of the hand is emphasized by an opaque border, likely of a calcareous nature.

"The vertebral column is not radiologically normal, especially in the lumbar region, where we find the vertebral bodies deformed (bamboo picture), and osteophytes resembling in shape a parrot's beak; but these anomalies correspond to a common process such as is observed in certain subjects affected with rheumatism or senile degeneration.

"Nothing to note in so far as the ribs are concerned.

"The bones of the head, as demonstrated by radiogram, have undergone the following changes; increase of the external diameters of the skull, thickening of the vault, and, finally, enlargement of the frontal sinuses. That the sella turcica is normal should be particularly noted. (See Fig. 9.)

"We have in short to do with a bony dystrophy, hitherto undescribed, characterized, in the bones of the limbs, by a fibrous degeneration of the cortical layers and a diffuse ossifying hyperplasia of the periosteum which has brought about an increase in their diameter, especially in the distal portions; in so far as the bones of the skull are concerned, by the sclerosis of the walls of the roof, and the enlargement of the frontal sinuses."

SUMMARY AND DISCUSSION

In summing up the salient features of the multiple lesions in this case, I would say that these present a hyperplastic and degenerative disturbance of certain connective tissues—bones, periosteum of the long bones, skin and subcutaneous tissues of the face and extremities of the limbs, and, above all, of the tarsus of the eyelids. This observation, characterized by a trilogy, allows me to describe a new disease having for its manifestations a hypertrophy of the eyelids, of the integuments of the face, and of the extremities of the limbs, and also of the bony system in general, caused most probably by an endocrine disturbance. Neglecting for the time being the hypertrophy of the integuments of the eyelids, face, and extremities of the limbs, I shall consider first that part of the syndrome which refers to the skeleton, and compare it with the different affections already known.

Though appearing like acromegaly, this syndrome does not present any of the essential features of this disease, so well described by Pierre Marie. Indeed, the disease of my patient appeared during infancy without gigantism; its evolution has been stationary for many years; the sella turcica is not enlarged; there is no lambdoidal projection; no prognathism of the inferior maxilla; no macroglossia; there are no evident neuro-vegetative troubles; no ocular symptoms; and the hypertrophied bones present osseous and periosteal lesions not found in acromegaly. Finally, induced hyperglycæmia shows good utilization of the carbohydrates.

We need hardly consider Paget's disease, because this affection, far from manifesting itself during infancy or adolescence, appears only at a late period of adult life; it is progressive; it causes most often an increase in volume of the skull and collar-bones; it produces a particular deformity of the tibias; it favours the onset of spontaneous fractures; it does not modify the integuments nor cause hypertrophy at the extremity of the limbs; and it is accompanied by pain, local elevation of temperature, and vertebral lesions different from those we have described. It also presents cardiac disturbance, and radiography demonstrates bones which have a characteristic wadding-like aspect that we do not find in my patient. The periosteal outgrowths alone have this appearance in my plates. The bone itself presents, rather, where its texture is definitely modified, an areolar aspect.

In Recklinghausen's disease of the bone, the periosteum is not involved; the bones are not increased in volume; the disease manifests itself during the adult period; the evolution is progressive; spontaneous fractures can be observed; the calcæmia is more considerable and phosphatæmia lessened; the extremities of the limbs are not hypertrophied; and, finally, we find the specific lesion in the substance of the bone, which is constituted by clear-cut cysts or deep areas of decalcification.

Nor do we have to do with the condition known as "marble bones", the generalized sclerosing osteitis of Albers-Schönberg, which is never accompanied by bony hypertrophy. This osteitis invades the whole skeleton; it develops with progressive anæmia; the opacity to x-rays is very considerable; and the integuments of the extremities are normal. Further, the affection is hereditary, and nearly always, manifests itself early in life. I shall eliminate also the melorheostosis, the osteopecilia, and the pneumo-chondrodystrophy of Pierre Marie.

I cannot admit that we have to do with an infectious process in the bone and periosteum. Indeed, no infection could provoke lesions so diffuse, so symmetrical, and so slightly progressive as those observed in my case, and which, at the same time, would be capable of originating a hypertrophy of certain integuments. Even syphilis, which attacks the bony system so often, could not produce such an array of symptoms. I am of the opinion that it is impossible to classify the syndrome of this patient in the category of any affection described hitherto, whether osseous, cutaneous, or palpebral. Consequently, I can only advance a hypothesis in regard to the etiology, a hypothesis based upon our endocrinological knowledge and on certain morbid factors concerning the relations of the patient and the place of his birth.

I shall only recall that this patient belongs to a goitrous family, that he was born and brought up in a locality where hypertrophy of the thyroid gland is endemic, probably due to the quality of the water and of food stuffs, conditioned by the nature of the territory in question. Considering these facts, I believe that I am in a position to group the different lesions he presented in one sole entity, constituting a true disease of certain connective tissues which I attribute to one single cause, and that of an endocrine nature. The hypertrophy of the palpebral tarsus, of the integuments of the face and extremities of the limbs, as well as the hyperplastic fibrous osteoperiostosis should be attributed to an upset of endocrine function in direct relation with an hereditary vitium transmitted by goitrous parents, or acquired as a result of a local pathological factor which maintained a hypertrophy probably associated with thyroid derivation. I place in the forefront of this imbalance certain physiological disorders of the thyroid and parathyroids. We have known definitely for some years that a functional disturbance of the last-mentioned glands has the power to provoke a perversion in the process of calcification of the bones and a mutation of the calcium, manifesting itself, on the one hand, by a fibrous degeneration of the cortical zone, and, on the other, by a sub-periosteal bony proliferation. If it is true that the sclerosis can be localized to one or to many organs there exist also numerous pathological cases in which this process can be generalized. The action of the parathyroids, therefore, could manifest itself on the connective tissue of one only, or of a group of organs, or even of all the organs of the body. In the case of my patient the sclerosis was localized to the tarsus of the eyelids, the integuments of the face, the extremities of the limbs, and of the bones. I think I can submit the hypothesis that the parathyroids had contributed in large part to its etiology. As the endocrine action manifested itself during the period of growth, at least in so far as the bones are concerned, this particular feature in its evolution explains perhaps the atypical character of the bony lesions. In spite of the fact that with radiography the sella turcica appeared perfectly normal, in view of the increase of the external diameters of the skull, the thickening of the cranial vault, and, finally, the considerable enlargement of the frontal sinuses, I am, nevertheless, of the opinion that the hypophysis is responsible for all the disturbances just specified.

The non-progressive character of the syndrome in my patient leads us to conclude that his affection completed its course long ago. In so far as the hypertrophy of the eyelids, and integuments of the face is concerned, it is easy

to come to the conclusion, on consideration of Fig. 7, taken eight years after the first one, (Fig. 6) that the small difference observed in these two pictures is due to the progress of age rather than to the continuation of the pathological process.

In so far as the hypertrophy of the palpebral tarsus is concerned, perhaps one should not totally ignore the ocular irritation produced by smoke, when the patient was twenty years old, an irritation which in the space of about two months necessarily resulted in a chronic conjunctivitis. And, besides, I must point out that the palpebral troubles made their appearance in the fall of the same year. This inflammation, in its turn, has perhaps participated in the development of such a strange disease of the tarsus, because the endocrine or humoral predisposition of the patient was of a nature to favour the reaction of fibrous hyperplasia.

CONCLUSION

I have detailed here a syndrome, hitherto undescribed,—comprising a trilogy, characterized by bilateral and symmetrical keloid hypertrophy of the tarsus of the eyelids, increased volume of the integuments of the face and of the extremities of the limbs, associated with an atypical osteo-periostosis generalized in almost all the bones of the skeleton—a syndrome caused, in my opinion, by an endocrine disturbance, and quite probably by the parathyroids and the hypophysis.

I desire to extend my sincere thanks to several colleagues who have assisted me in various ways in the study of this case: Professors Pierre Masson, J. E. Gendreau; Associate Professors L. C. Simard, A. Bertrand; and Drs. R. Amyot, H. Gélinas and A. Jutras.

THE SURGICAL TREATMENT OF CHRONIC RADIATION DERMATITIS*

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Toronto

RADIATION dermatitis is a lesion which, in spite of all known precautions, still presents a problem in treatment. The early and unguarded use of x-rays resulted all too frequently in most distressing lesions. Many theories were advanced in explanation, such as the formation of ozone in the tissues, decomposition of water in the tissues, heat, an unidentified ray, platinum particles from the tube. By the beginning of this century it was at last recognized that responsibility for the lesions belonged to the active x-ray tube. Today appropriate shielding, filtering, and controlled dosage have resulted in a marked decrease in the number of cases, in spite of the fact that radiation is being employed more and more widely.

Patients suffering from radiation dermatitis have been divided by Porter into three clinical groups: first, those who have received a single therapeutic or diagnostic dose; second, those who have received repeated doses at intervals; and, third, the personnel administering the treatment and who have suffered injury. The lesion in the first group may be due to an individual idiosyncrasy, to the radiation of an area in which vascular damage is already present, or to heavy dosage by design. Thus the development of a radiation dermatitis is not evidence of faulty or careless technique. By far the largest clinical group is the second.

PATHOLOGY

Wolbach investigated the effects of the rays on the skins of animals, the results being compared with lesions found in the human being. The first structure to show change following radiation is the collagen of the corium, blood-vessels, and lymphatics. The change consists of a swelling and coalescing which produces an atypical collagen poor in cells. Regeneration does not take place in this changed connective tissue; instead, new connective tissue is laid down by the unaltered fibroblasts. This same process occurs in the walls of affected blood-vessels and results in a gradual obliteration. The slow occlusion of these vessels accounts for the latent period between treatment and untoward result. Telangiectatic vessels develop

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Fig. 1A.—Extensive lesion caused by radiation therapy of an hæmangioma. Radium had been first used twenty-four years prior to his reporting for surgical therapy. Ulceration had been present for the past five years. In February, 1934, the lesion was excised and a pedicle graft from the forehead swung down on a temporal artery pedicle. **Fig. 1B.**—The result obtained 18 months after excision. Graft on the upper lip is a pedicle graft obtained from the forearm, the graft on the nose and cheek from the forehead. The forehead defect has been repaired with a Thiersch graft. **Fig. 2A.**—Patient was treated for a rodent ulcer of the ear in January, 1932. During June, 1935, he developed a small, painful ulcer at the site of his previous lesion. Wide excision and resuture was carried out in July, 1935. **Fig. 2B.**—Appearance of the ear in October, 1935. **Fig. 3A.**—Patient had implantation of radium needles in lower lip in 1926 for carcinoma. Lesion recurred in 6 years and was again treated by implantation of radium needles. In December, 1933, a small, hard, bluish area appeared in the centre of the lower lip. A sloughing, painful ulcer formed. During December, 1934, the lower lip was completely excised and the defect repaired by sliding in lateral flaps. **Fig. 3B.**—Result, 1 month after treatment by excision and repair. **Fig. 4A.**—Patient received radiation therapy to soles of both feet for a lesion of the plantar fascia in April, June and September, 1930. Reported in March, 1934, with a typical lesion on sole of left foot. This lesion was treated by excision and immediate Thiersch graft. **Fig. 4B.**—Result of treatment of lesion shown in 4A. Patient has been walking on this graft for 18 months without any untoward effects.

as the lesion progresses. These may appear within four months, although they are usually first seen during the second year following treatment. Thrombosis may occur in these vessels. A small area of local necrosis results. The epidermis may grow down and under the thrombosed vessel in an attempt to get rid of it, and at the same time to maintain an unbroken epithelial surface.

The epidermis apparently is not affected directly by the ray, the changes occurring in it being secondary to changes in the corium. Typically, in the chronic case, the epidermis becomes thin, white, and loses its hair, sweat and oil glands. The superficial cells remain attached to each other, to produce poorly keratinized masses — the hyperkeratoses of the chronic lesion. This activity on the part of the epithelium, in an abnormal tissue, may eventually result in a definite malignant change.

CLINICAL SYNDROME

Two clinical types are to be found, the acute, and the chronic. The former develops rapidly after exposure and is due to actual cell death. An irregular shallow ulcer results. The surrounding margin is inflamed, though not acutely, and sodden, the edges low and slightly shelving. The surface is composed of a dense yellowish, shiny, homogeneous-appearing tissue, and the discharge is thin and irritating. The lesion is usually quite painful, the pain being burning in nature. A few months to many years may be the latent period of the chronic type of radiodermatitis. A period of 20 years has been known to elapse between treatment and the development of the lesion.

The first change to appear is a brownish pigmentation in the radiated area. This usually fades in a year. Telangiectases appear in the thin, dry, hairless skin. These may be few or may be very diffuse and abundant. Dark areas of thrombosis appear, the so-called "coal spots". As the corium gradually thickens the whole area tends to move as one piece when touched by the examining finger. The patient complains of itching and burning in the involved area. These symptoms may be very persistent and cause great discomfort. Hyperkeratoses develop, tiny cracks appear in the skin, and eventually ulceration supervenes. Finally, malignant changes may develop in the ulcerated area.

TREATMENT

The surgical treatment of chronic radiation dermatitis is directed towards the relief of symptoms, the repair of deformity, and the removal of the danger of malignant change. Small acute lesions may respond to appropriate local treatment. Briefly, the surgical treatment consists in adequate excision followed by some type of plastic repair. As the extent, location, and degree of the lesion varies in each patient, and as patients vary in their opinion of a satisfactory repair, it will readily be seen that each case presents an individual problem.

By plastic repair is meant the use of some type, or types, of skin grafting. Grafts are divided into two main groups, the attached, which have been used from time immemorial, and the free, which have been in use for approximately 65 years. The attached include the direct and indirect pedicle grafts; the free grafts are the pinch or Reverdin, the Thiersch or razor graft, and the full thickness, or Wolfe graft. Any one or any combination of these grafts may be used in the repair of chronic radiation dermatitis. The choice depends upon the amount of time available and the cosmetic effect desired. The majority of cases are treated by wide excision followed by a Thiersch graft.

Excision and plastic repair of chronic radiation dermatitis relieves the itching, burning and pain, improves the appearance, lessens or removes the deformity, and eliminates the potential danger of malignancy.

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SYPHILIS OF THE PLACENTA*

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THE modern-day belief in selective child-birth as brought about by a generalized knowledge of the physiology of conception and the ever-growing demand of economic pressure has resulted in the proper spacing of pregnancies and the limitation of the number of children born to each individual family. The average age of marriage is more advanced, resulting in a shorter period for fruition. These well known facts have placed the accoucheur in a more responsible position to the parents, because when called upon he is supposed to produce a normal, healthy child. He must, therefore, examine more carefully for the diseases of the mother which cause fetal wastage, in order to preserve this small, selected family. Fetal wastage is greatly augmented by that well known disease, syphilis, a disease which occurs in 10 per cent of pregnant women, ranging from 1 per cent in our own district to an unforgivably high mark of 16 per cent in the coloured races to the south. Twenty per cent of syphilitic pregnant women bear dead-born babies, ranging from 1½ to 7 months' gestation. Ten per cent of syphilitic children born alive die in infancy or childhood from syphilis or from intercurrent diseases.

Fifteen years ago, in this institution, a routine blood examination for syphilis was part of the general examination of the patient. This resulted in a widespread fight against and practical elimination of syphilis. We then passed into a period of quiescence from the disease resulting in the elimination of the Wassermann test from the general routine medical examination. Consequently, slowly but silently, the disease again claimed victims unknown to themselves, and now we are again compelled to place the Wassermann test in our routine examination.

In 1932 we noticed that 4.8 per cent of the total number of placentas sent to us for examination showed histological evidence of syphilis. The follow-up Wassermann test on these cases gave 66 per cent positive results. In 1933, because of experimental study going on in this department upon the placenta, the percentage was greatly altered. In 1934 10 per cent of the placentas sent to us showed histological evidence of syphilis, and 50 per cent of these women were found to have four-plus Wassermann reactions. During 1934 the clinic instituted a routine blood Wassermann test and this is being taken upon the first visit of the patient to the clinic. During the first seven months of 1935 we examined histologically 85 placentas, of which 14, or 16.5 per cent, showed a histological suggestion of lues. Eight of these, or 57 per cent, had positive Wassermann tests.

How do we explain this variable picture which we see in placentas of syphilitic fetuses? It is best understood by studying the method of infection from the mother to the fetus. It has been shown by Ssolowjew that the spirochæte can pierce through the chorionic layer without doing damage, because he found one half way through the epithelium of a normal villus. Bianca Bienenfeld, and also Frankl,[1] showed spirochætes in the villous stroma which had not excited any local tissue change. We must also consider that placental changes are often late manifestations of lues. The internal parenchymatous tissues of the fetus, such as the liver and the kidney, are usually damaged considerably before the external parenchyma of the fetus, the placenta, shows any pathological change. We must also remember that the spirochæte stimulates proliferation of mesodermic connective tissue and retards proliferation of mesothelial and epithelial structures. The same atrophy of chorionic epithelium in the placenta goes on as does atrophy of liver epithelium, with consequent increase in connective-tissue content. We must also consider that syphilis tends to produce endarteritic changes with a gradual diminution in blood supply to the tissues affected (Fraser, 1923[2]). We must not forget that in an organ like the

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placenta, where an active double circulation exists, with a gradual anatomical change in the size and shape of the intervillous spaces that goes on with ageing, the intervillous spaces will be altered according to age. If we bear these facts in mind it becomes much easier to determine and to remember the histological changes that ensue in syphilis of the placenta. The histological picture of the placenta will then be determined according to its age.

Observation, palpation and injection of the normal placenta at six months show a comparatively thin, plate-like placenta with a fine villous circulatory bed. The parenchymatous organs of the fetus now increase their metabolism; the fetus grows faster, and consequently demands more nourishment. The placenta responds to the increased demand put upon it by showing a more active proliferation of syncytium, producing numerous small buds growing out from the main villi like a tree budding in springtime. This proliferation of syncytium is more active at the distal part near the decidual, or maternal, surface. Small villi are now seen in gradually increasing numbers, crowding the intervillous spaces but

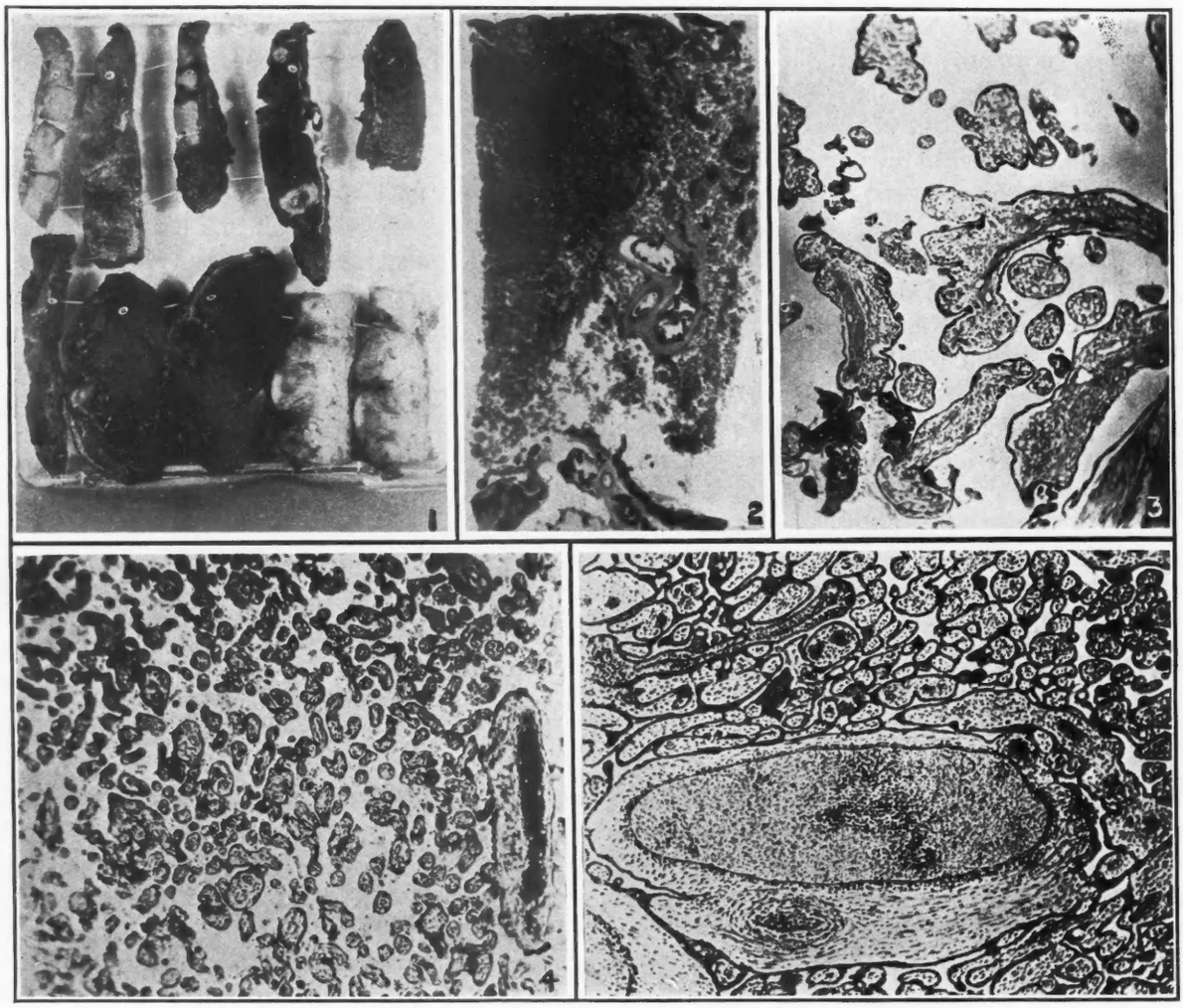

Fig. 1.—Upper row; left to right: A small, atrophic, necrotic placenta. A large, thick, heavy homogeneous, hyalinized placenta. Placenta showing fetal infarction. A large, thick placenta showing various stages of maternal infarction. A thick, bluish, wet placenta; thrombosis in main subamniotic vessels. Bottom row: left to right: Numerous reddish sequestra: diffuse maternal infarction. Large, round, thick, heavy, bluish, wet placenta of venous congestion. Looks like pneumonic lung. An irregularly thickened, greyish-pink, inelastic, non-infarcted placenta typical of syphilis. **Fig. 2.**—Sagittal section through a thick mature placenta. Note the density of tissue near the maternal surface where syphilitic changes were found. **Fig. 3.**—Photomicrograph of 5 months' syphilitic placenta. Note change in architecture, loss of tapering effect of the villi, atrophy of chorionic epithelium and increase in mesodermic stroma. **Fig. 4.**—A normal mature placenta. Numerous small proliferating villi. Intervillous spaces free. **Fig. 5.**—The typical syphilitic placenta: exudate in walls of sub-amniotic vessels and in the walls of the large vessels. Crowded intervillous spaces. Toxic conglomerations of syncytium. Cellular villous stroma and loss of spindle arrangement of chorionic epithelium.

never normally touching each other. In the ninth month the placenta is entirely constructed of numerous small villi which are covered by a thin hyalinized syncytium lying parallel to the surface.

A suggestive diagnosis of syphilis of the placenta can be made if one carefully follows out a strict routine macroscopic examination. All blood clot should be washed off the freshly expressed placenta, which should be carefully palpated and weighed. With a long sharp knife cut the placenta from edge to edge at intervals of about three centimetres, leaving the chorionic membrane intact. With the placenta open like an accordion note the thickness and consistency.

Not all thick heavy placentas are pathognomonic of syphilis. Occasionally we see a very large, overgrown, over-mature placenta without any pathological change. We frequently see a thick, heavy, pinkish, glassy-like, homogeneous placenta due to a rapid spread of hyaline material throughout. The fetus often dies during labour with this type of placenta. We also occasionally see a very thick, yellowish, gelatinous placenta associated with erythroblastosis of the fetus. In this case the fetus is tremendously œdematous. The thick, heavy, wet, bluish, soft placenta, looking like a pneumonic lung, is due to a chronic venous congestion of both circulations of the placenta. This is a toxic manifestation. There is also the thick, infarcted placenta with numerous soft, reddish sequestra and occasional areas of white infarction.

The typical syphilitic placenta is thick, greyish, firm, dry, and does not show evidence of maternal infarction; but where there has been a toxic manifestation in the placenta before it was affected by syphilis infarction is frequently seen and is more marked near the chorionic membrane. Late syphilis of the placenta more frequently produces near the maternal surface thick, reddish-grey, firm areas, because this is the path of growth and proliferation. We have noticed that many placentas do not show syphilitic changes in that portion near the chorionic plate. Here one may see large masses of hyalinized, atrophic villi with much evidence of senile change, yet if sections are taken near the maternal surface a typical histological picture of syphilis is seen. For this reason we find it advisable to take sections extending from the chorionic plate to the maternal surface.

The histological features of a syphilitic placenta at six months' gestation are difficult to determine because of the persistence of proliferation of trophoblast and also the large amount of villous connective tissue present. We have said that syphilis retards epithelial growth. We get, therefore, broad, stunted, club-shaped villi, Gothic in architecture, with a decrease in the powers of proliferation of chorionic epithelium. Normally the villi at this age should be more tapering, Romanesque in architecture, with active syncytial proliferation. The intervillous spaces are still large at this period of gestation, and any appreciable increase in connective-tissue proliferation does not sufficiently enlarge the villi to obliterate large intervillous spaces. Consequently, the villous surfaces do not touch and there is a lack of conglomeration of syncytial clumps. There is also no appreciable change in the structure of the villous vessels and there is less tendency for exudates in the walls of the sub-amniotic and cord vessels.

In the syphilitic placenta of seven months the overgrowth of connective tissue, especially in the newly formed villi, produces larger, coarser villi. There is also a slowing in the degeneration of the old villi because of their large content of mesodermic tissue which does not degenerate easily. These two combined changes cause the intervillous spaces to be gradually encroached upon, with resultant touching of the chorionic epithelium of adjacent villi. There now form toxic conglomerations of chorionic epithelium in the intervillous spaces. This is a most reliable and constant finding and is first noticed about the seventh month. Other finer observations show thickened, obliterated villous vessels and a tendency to round-cell exudate in the walls of the sub-amniotic vessels. When the sub-amniotic vessels show an intra-mural exudate usually the cord vessels near the fetal surface of the placenta also show it. Other points which I have noticed are that the villous stroma often produces a more cellular arrangement of connective tissue cells, because it is proliferating more rapidly, and the chorionic epithelium also shows a tendency to produce more round,

separated cells which lie adjacent to each other but do not form the long, linear, parallel, hyalinized strips that are normally seen. These points become more accentuated in the last months of pregnancy.

We have now begun, in this clinic, a routine examination of all cord bloods where the Wassermann test in the mother is positive. This is done with a dark field illumination and is being carried on by Dr. J. C. Whyte. This, I hope, will prove to be a profitable and helpful measure in the investigation of syphilis in the fetus.

Syphilis of the placenta may, therefore, be classified under: (1) vascular and endarteritic changes; (2) the presence of exudate in the walls of the sub-amniotic and cord vessels; (3) atrophy of epithelial structures; (4) proliferation of mesodermic tissue; (5) gradual obliteration of the intervillous spaces, with toxic conglomerations of epithelium in the intervillous spaces. (The age of the placenta must be determined when using this factor).

Helpful measures are the proper sectioning of the placenta, a search for spirochætes in the cord blood, and a serological study of the mother's blood. Since we have established this routine in our clinic we have noticed a sharp rise in the percentage of syphilitic placentas detected.

I am indebted to Mr. W. J. Plumpton for his assistance in preparing this paper.

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PENTOTHAL: A NEW INTRAVENOUS ANÆSTHETIC*

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THE induction of general anæsthesia by intravenous injection has apparently had a fascination for the investigator since the earliest days of the specialty. More or less successful attempts have been made to use in this way such widely differing chemicals as ether, morphine, avertin and paraldehyde—to mention a few. To the barbiturates, however, must go the premier position, for it is they which seem to offer the greatest hope of providing a really satisfactory drug. Many of the vast array of barbituric acid sedatives have been tried in this way, notably sodium amytal and nembutal. Doses necessary to produce surgical relaxation are frequently followed by such prolonged unconsciousness or troublesome excitement that many of the advantages of these drugs are lost. Hence they have now been relegated more to the rôle of basal sedatives, to be supplemented by an inhalation anæsthetic. For this purpose administration by the mouth gives adequate results in most cases, and so the intravenous injection is not widely used as a routine but saved for selected cases.

An entirely new angle of the problem was revealed with the introduction, in 1933, of evipal (evipan), a drug closely related to the others chemically but differing widely in its action, giving complete anæsthesia for short periods, with very rapid and pleasant recovery. With many others, we[1] reported favourably on this drug in its early days, and since then a rapidly growing literature has hailed its world-wide use. It is now recognized as suitable only for short procedures (about 5 to 20 minutes), preferably those in which complete relaxation is not required for more than 3 to 10 minutes. In such cases recovery is complete in about 20 minutes. Its use has been remarkably free from accident, but certain difficulties have arisen, particularly a muscular twitching, amounting almost to convulsions, in susceptible patients or with large doses. While this reaction is not serious it interferes with relaxation. With restriction to suitable cases, however, evipal has established a place for itself. Therefore, when there became available another drug, offering similar advantages, plus prolonged and complete relaxation, we welcomed the opportunity of trying it. The manufacturers* placed at our disposal the first

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* Abbott Laboratories, Chicago and Montreal.

supply available for experimental use in Canada, and our results have been so striking that we feel justified in offering a preliminary report. Much further work must be done before this drug can be accepted as suitable for general use. Probably further chemical research will evolve another and improved member of the group, but so good are the results with this one that it will go far in popularizing the intravenous route and preparing the way for its more perfect, but yet unborn, successor. Even if evipal is doomed to eclipse, it is deserving of our thanks, for its rôle of missionary in the field of short-acting, quickly metabolized anæsthetics.

The new drug was first used at the Mayo Clinic, in November, 1934, and Lundy[2] and Hale[3] have published data dealing with 700 cases without mishap and with considerable satisfaction to their surgeons. Quite extensive pharmacological and clinical investigation has been carried out by Waters[4] at the University of Wisconsin. These constitute the only reports available at the time of this writing, although similar work is, no doubt, under way at other centres or in the process of publication. Chemically, the drug is sodium ethyl (1-methyl butyl) thiobarbiturate. It was tentatively called "thiobarbiturate No. 8064", but the new name "pentothal" has now been officially adopted, since a number of other thiobarbiturates are being tested by the same and other chemists. It is a slightly yellowish, crystalline powder, rapidly soluble in distilled water, yielding a lemon-coloured solution, with an objectionable odour resembling garlic. It is supplied in ampoules containing 1.0 g. of the powder, from which is prepared a standard 10 per cent solution by the addition of 10 c.c. distilled water or normal saline. The dose is most conveniently expressed in cubic centimetres of this solution, or may be more accurately quoted in milligrams of the actual drug, since the solution contains 100 mg. to 1 c.c. Waters investigated the action in rats, rabbits and dogs when given by mouth, by rectum, and intravenously. He found it to be primarily a respiratory depressant, death being due to respiratory failure, with relatively little action on the heart. This allowed considerable latitude in resuscitation from overdoses. Given intravenously in dogs, the minimal lethal dose was 30 to 35 mg. per kilo, with about half that amount being needed for satisfactory anæsthesia. In comparison, the minimal lethal dose of evipal is 45 to 50 mg. per kilo but, as larger doses are required, the ratio of safety is slightly favourable to pentothal.

We present careful observations on 60 administrations at St. Michael's Hospital, in November and December, 1935. This includes the work of all members of the anæsthetic staff. The series, while small, embraces a wide range of operations, handled with almost uniform success, and a variety of post-operative developments which point the way to what may be expected.

A useful anæsthetic must be safe for the patient, and satisfactory not only to the anæsthetist but also to the surgeon during operation and the nurse during recovery. Twenty surgeons operated with pentothal alone. All except one were enthusiastic. Seven wards received patients, with less complaint than with any other recent innovation. The best comment is the work actually done. There was only one failure to obtain the desired relaxation (in hæmorrhoidectomy, in a very robust man). Relaxation equal to that with spinal anæsthesia was demanded but not obtained until supplemental nitrous oxide was used. All other operations were successfully carried out without inhalation anæsthesia of any kind. The post-operative course was uneventful, except in one case of suspected kidney damage, which will be described later. Full surgical relaxation was required and obtained in 39 cases, as follows: vaginal hysterectomy 1, appendectomy 2, curettage 3, 1st- or 2nd-stage prostatectomy 4, supplement to spinal 2, bronchoscopy 1, tonsillectomy 3, operations inside mouth 6, introduction of intratracheal catheter 5, enucleation of the eye 2, manipulation of fibrosed joints 4, fractures (Colles and metacarpals) 6. The remaining 20 cases were abscesses or biopsies in which little relaxation was required, although full surgical relaxation could apparently have been obtained if indicated. The patients were universally pleased with both induction and recovery.

Our use of pentothal was limited not by the degree of relaxation required but by the length of time it was to be maintained. The desirable limit is probably 20 to 30 minutes. Thirty-three operations were under 10 minutes; 19 ran from 11 to 20 minutes; and 5 extended beyond 20 minutes, the longest being 35 and 39 minutes. If the surgeon anticipates longer operating time, then other more suitable agents are available. He may be assured however that if unexpected difficulties prolong his operation good anæsthesia will still be continued. Operating conditions will probably remain satisfactory, but the dose required will almost certainly be followed by delayed or restless recovery, with the added risk of later organic damage. The effect of pentothal is too transitory to allow of its use as a basal sedative, although nitrous oxide and ether may be safely used with it. This was done deliberately seven times, as in a radical breast amputation, following removal of the tumour, for quick section with pentothal, or, similarly, hysterectomy fol-

lowing examination under pentothal. The saving in time in such preliminary examinations is quite remarkable. The introduction of an intratracheal catheter with pentothal alone was quite simple, but the resultant gas anæsthesia was disappointing. Spasm and coughing forced the addition of some ether—not for the introduction of the catheter as is usually stated but for the strengthening of the nitrous-oxide effect throughout the operation. This is an excellent test of the status of intratracheal nitrous oxide without the assistance of ether.

The patients were chosen at random, with no attempt to confine the work to easy cases. Males predominated by 2 to 1, with no appreciable difference. The youngest was 14, with 4 under 20 years. The oldest was 76, with 6 over 60 years. Weight varied from 80 to 220 lbs., with 6 under 110 lbs., and 4 over 190 lbs. There were 29 good risks, and, of these, two-thirds were of the robust, muscular type which are difficult subjects for any form of anæsthesia. Thirty-one patients were classified as ranging from fair to bad, because of the following complications — toxic conditions, carcinoma, diabetes, anæmia, obesity, myocarditis, spinal cord tumour, and lung abscess. No difficulty was encountered in any case except following blockage of the airway by the surgeon or with large doses of morphine. Two developed hiccoughs during operation; although quite violent for two minutes, these cleared up with carbon dioxide. Two complained of some soreness of the arm following leakage of the solution, which is apparently about as irritating, subcutaneously, as glucose. It caused no trouble whatever when confined to the vein. Three showed very slight, generalized, muscular twitching, one during operation and two after. Twitching is generally accepted as a sign of overdosage with any barbiturate. It was very mild compared to that with evipal, where it constitutes the greatest drawback to the use of the drug. One woman had had a fractured jaw wired under 7.5 c.c. evipal, with considerable post-operative excitement and actual convulsions. Three weeks later, with 4.5 c.c. pentothal, the wiring was adjusted easily, with perfect recovery. There was no tremor or nausea. She talked in 15 minutes and was entirely rational in thirty minutes. This bears out the general impression that pentothal is superior to evipal.

The safety of pentothal lies in the rapidity of its action, so that injection may be continued or stopped, depending on the depth of anæsthesia. Changes occur even more rapidly than with nitrous oxide. To obtain this effect, the drug must be given in fractional doses, the needle being left in the vein and more added from time to time throughout the operation. It is entirely impossible to obtain good anæsthesia by any fixed dose, injected at one time. Contraindications are quite similar to those with avertin or nembutal combined with morphine. As with other respiratory depressants, smaller doses are required in the obese, the cachectic, the toxic, and the patient with poor elimination. General condition is a much greater factor than body weight. Our weights were noted, but the total dose in milligrams per kilo was calculated after the operation was over, for statistical purposes, not as a guide at the time of administration. Our attempt was to arrive at the therapeutic dose in man, as compared to the fatal dose in dogs. In 55 per cent of cases good anæsthesia was obtained with 9 mg. per kilo or less, compared to Waters' fatal dose, in dogs, of 35 mg. per kilo—a ratio of safety of 4 to 1. In all 80 per cent of operations were done with 12 mg. per kilo or less—a ratio of safety of 3 to 1. The remaining 20 per cent represented longer operations in robust patients. Of these, 5 received 18 mg. per kilo (½ fatal dose), and 1 actually received 27 mg. per kilo and was talking in 20 minutes and completely rational in less than one hour. Thus very large doses can be tolerated if given in divided amounts. It cannot be too strongly emphasized that these large doses were given fractionally, more drug being added as metabolism proceeded, whereas Waters' fatal dose was, presumably, based on a single injection. To attempt anything like these amounts in one dose would, we believe, be almost certainly disastrous.

The onset of sleep was invariably pleasant, rapid and peaceful. In no instance was there the slightest movement or restlessness. For this reason, all possible preparation of the skin, sterile draping, etc., is carried out before injection commences. The patient counts slowly, until sleep intervenes. In over two-thirds of

our cases drowsiness came on at the count of from 7 to 20, with full natural sleep in 1 minute from the start. This was obtained by injecting 3 c.c. rapidly (in from 7 to 15 seconds), followed by a pause of 45 seconds, during which the patient passed from euphoria to sleep. In this initial sleep there was usually very little change in respiration, colour, pulse or blood pressure, but these signs must be carefully watched as guides to further dosage. Relaxation comes on more slowly than unconsciousness, hence the importance of the pause of at least 45 seconds after the initial 3 c.c. If at the end of 1 minute relaxation is insufficient, another 1 c.c. is given slowly, in 10 seconds, followed by a pause of 20 seconds.

This technique gave complete relaxation in two-thirds of the cases, and allowed incision in one and one-half minutes from the start. In poor risks, the initial injection should not exceed 2 c.c., with a later 1 c.c. for relaxation. This was sufficient in 7 poor types. On the other hand, in about one-third of the cases sleep did not commence until 4 c.c. had been given, and relaxation demanded another 1 or 2 c.c. It is very important to pause for almost one-half minute after each additional 1 c.c., since the cumulative effect may appear suddenly. This method of induction may be accepted as a safe routine, but further dosage will depend entirely on the patient's reaction. Fortunately, relaxation of the jaw goes hand in hand with that of the abdominal muscles. This offers an unusually good guide to the plane of anæsthesia. With satisfactory abdominal relaxation, the jaw is absolutely flaccid and can be moved with one finger without resistance. If this is continually observed, it will be seen that a slight tightening of the jaw occurs 30 to 60 seconds before spasm of the abdominal muscles returns. At the commencement of jaw-tightening the addition of 1 c.c. will deepen the patient so rapidly that the surgeon will not be conscious of any interruption in relaxation in his field. Changes in the eye follow the jaw signs closely, but are not quite so reliable. A widely dilated pupil, with fixed ball, means momentary overdosage. The injection must be stopped and respirations watched, for they will by then have become slow and shallow. With normal abdominal relaxation the ball is fixed or moving slowly, with the pupil moderately dilated and reacting to light sluggishly. With returning lightness the ball moves widely, the pupil assumes normal size, and reacts to light actively. These signs change very rapidly, dilatation of the pupil occurring in 10 or 20 seconds after an additional 1 c.c., provided no pre-operative sedative has been given. With morphine the eye cannot be depended upon, but the jaw remains a satisfactory guide. Morphine materially increases respiratory depression without giving very much increase in working time. We feel that it should be avoided, as undoubtedly adding to the danger, without giving sufficient increase in relaxation to justifying its use.

Nor does it seem logical to use any other barbiturate before this very potent member of the same group. We believe that it is much safer to give enough of the one drug to get its full effect than to combine a small dose with another depressant. Therefore, if a sedative has been given it must be followed by great care in combating central respiratory depression, notably, by the scrupulous maintenance of a clear airway. This conclusion follows the observation of 39 cases with no sedative and 21 with morphine, gr. 1/4 or 1/6, with atropine. Of the morphine cases two-thirds were entirely satisfactory, but 7 showed undesirable effects; 3 had definite respiratory depression and mild cyanosis, with a drop in blood pressure of 10 to 30 points; 3 others slept for one to one and one-half hours, and were not entirely rational for another hour; the remaining one presented our only alarming reaction. This was a tonsillectomy, where extensive bleeding and manipulation of the mouth gag shut off the airway, with momentary stoppage of breathing. Restoration of the airway allowed easy completion of a difficult operation. In contrast, 2 other mouth operations, without morphine, showed similar obstruction with no particular trouble. Despite the respiratory difficulty, the pulse remained excellent, showing relatively little effect on the heart, except secondarily through anoxæmia. The use of oxygen and carbon dioxide, therefore, would seem to be the method of choice in combating overdosage and should prevent any fatality. Coramine, 5 c.c. intravenously, was given four times in an endeavour to hasten awakening. It had no spectacular effect, but is undoubtedly the best drug to com-

bine with oxygen, should dangerous depression arise. In half the non-morphine cases the colour, respiration, and pulse showed little change, and the blood pressure actually rose from 5 to 15 points. The other half showed mild depression, about equal to that with combined morphine and nembutal, with a drop in blood pressure of 10 to 20 points. Two cases of myocarditis reacted excellently.

Recovery is one of the outstanding features of pentothal. It is not so rapid as after nitrous oxide but more pleasant. Almost invariably, there is a period of euphoria not seen with inhalation anæsthetics. Most noteworthy is the absence of vomiting, which occurred in only 2 cases. Both patients had eaten just previously. In 11 cases anæsthesia followed a full meal, and in several water or tea was given immediately on awakening without the slightest nausea. In this it resembles evipal in surpassing any inhalation anæsthetic for safety, with a full stomach. If undisturbed, the well-behaved patient lies as in natural sleep, and in about 15 minutes from the end of operation opens his eyes, moves around quietly, and gradually orients himself, taking another 15 or 20 minutes to become fully rational. One-half of our patients could be left unattended with perfect safety in less than 30 minutes from the end of operation. Following recovery to this stage, however, there is a period of ataxia or incoordination lasting for 1 to 2 hours. He is absolutely normal in bed, but on attempting to walk may be dizzy, with drunken reeling. An ambulatory patient should remain lying down for at least 2 hours from the time he is fully rational. Eight walked home alone in two to three and one-half hours, but could have gone sooner, had they been accompanied. It is therefore hardly an office procedure but is very satisfactory in the home since the patient can be left in a few minutes. This type of normal recovery was found in 90 per cent of cases, after eliminating 7 which were purposely combined with gas and ether. Recovery of these combined cases was apparently unaffected by the drug. Of the 53 straight pentothal anæsthesias, 48 showed normal recovery, in whom 4 answered questions in 3 minutes, 32 in 10 to 20 minutes, and 12 not until 25 to 40 minutes. All in this group were rational in less than 1 hour from the end of the operation—7 being rational in 10 minutes, 23 in 20 to 30 minutes, and 18 in 25 to 60 minutes. Only 5 showed any deviation from this normal, and these were about equal to the average ether recovery in the same type of patient and operation. These all followed large doses—11 to 18 mg. per kilo, given for from 12 to 26 minutes. Two of these particular patients were noisy and cried out for 20 minutes and 2 hours, respectively, but were fully rational in 1 and 3 hours; 3 others tossed around in bed, moaned and muttered incoherently for 20 to 60 minutes. They were entirely safe but required watching (without restraint, however) until rational in 1½ to 2 hours.

This picture is highly satisfactory, but the problem of the future lies in the possibility of delayed toxicity affecting the liver, kidney, heart, etc. This point can be determined only after repeated animal experiments or clinical observations, under conditions of diet and exercise more rigidly controlled than was possible in our work. Blood chemistry was undertaken in 13 patients, including most of those with large doses or abnormal recovery. The results point to little systemic damage under practical working conditions. Five patients received multiple doses, the second being given from 3 to 26 days after the first, without evidence of cumulative toxicity. Blood sugar is apparently not affected; 17 post-operative readings showed no significant change. There were 2 diabetics, one with a pre-operative blood sugar of 0.218 per cent; with insulin the course was excellent. The possibility of such massive doses of a barbiturate precipitating agranulocytic angina was considered, although it is now quite widely admitted that barbiturates are not the cause. Certainly, there was no evidence of such action in 10 cases, checked at from 2 to 30 days; the white cell and differential counts remained satisfactory, as compared to a leucopenia and relative lymphocytosis to be expected with this obscure blood disease. No liver function tests could be obtained, although the companion drug, evipal, is metabolized in the liver without damage. The very important question of kidney damage was investigated by estimation of the urea-nitrogen content of the blood. Nineteen readings were taken, at from 1 to 12 days (the majority at 1 to 2 days). All remained within normal limits. Eleven were entirely

normal (under 15 mg. per 100 c.c.), and 8 were high normals (16 to 19.6 mg.). In 3 cases the 48-hour test was 2 to 3 mg. higher than the 24-hour reading, although still within the range of normal metabolism or laboratory error. Practically all bed patients had pre- and post-operative urinalyses. Only 1 (aged 76) showed a trace of albumin, and her blood remained normal. One, with definite pre-operative albumin, showed none after 2 large doses (18 mg.) 3 days apart. This seems to point to any kidney damage being transient and probably unimportant. Possible exception to this conclusion depends on the significance which may be attached to our only questionable reaction. High fever and generalized œdema followed the use of 5 c.c. (10 mg. per kilo) for the introduction of an intratracheal catheter as a preliminary to intratracheal nitrous oxide-ether anæsthesia for 2 hours. It was entirely a question of late kidney damage, there being no suggestion of too deep a sedative action. The surgical service disclaimed responsibility and attributed her condition to an acute nephritis due to pentothal. Extenuating circumstances were, a relatively large intake of fluids, intravenously and by mouth (ranging from 3,700 c.c. to 6,000 c.c. daily for 5 days), and the development of infection in the wound. Medical consultants were of the opinion that it was a matter of excessive intake rather than defective output. A reasonable explanation is that the initial temperature followed mild pulmonary changes, undetectable clinically, and that, as the wound infection gained headway, this became the active factor in the fever. To combat this temperature intravenous infusion was increased, apparently beyond the limit of the patient's tolerance. Subsequent progress was satisfactory, and we believe that the above explanation would have been accepted had a more orthodox anæsthetic been used. Of course, if similar reactions are reported by others we shall be forced to change our interpretation of these symptoms, but until then we are loathe to abandon pentothal on the basis of one case, surrounded by such an element of doubt.

To a number of ingenious devices, designed to facilitate fractional injection, we add the one illustrated. The only claim to originality lies in the manner in which several well known pieces of apparatus have been combined and adapted from their original use. Manipulation of a three-way valve allows a steady flow of saline, to prevent blockage of the needle, with intermittent additions of the anæsthetic solution in accurately measured amounts as needed. There is a trough-shaped, metal arm rest, 20 inches long, in which the arm lies naturally. It is fixed rigidly, but comfortably, by wide elastic bands at each end. Perforations in each band allow it to be hooked over projecting studs on the arm rest, giving the correct tension to prevent flexion or rotation. At the distal end of the arm rest is a socket, into which fits tightly a metal pillar, 15 inches high (such a socket is provided at each corner of the arm rest to accommodate this pillar in any type of working position). To the pillar are attached, by spring clips, 2 Luer syringes: 20 c.c. for saline and 10 c.c. for anæsthetic. Each upright syringe is joined by short rubber tubing to one arm of a three-way stop-cock, which is rigidly mounted on the face of the pillar between the

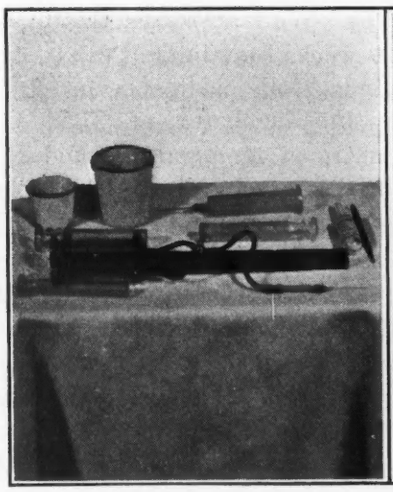

Fig. 1

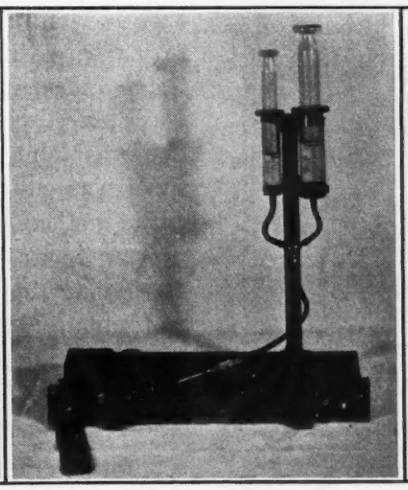

Fig. 2

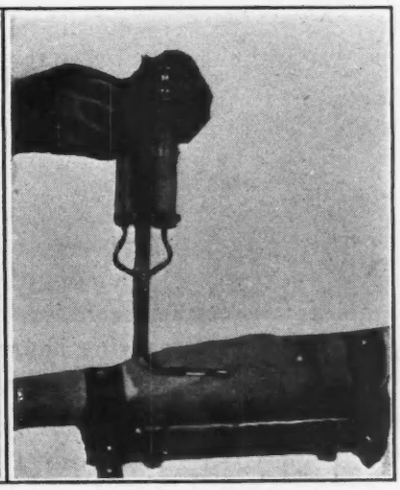

Fig. 3

Fig. 1.—Sterile preparation tray; pillar, syringes and tubing sterilized as a unit; cups for water and saline; syringe and needle for preparation of solution and withdrawal of blood; ampoule of pentothal powder and file. **Fig. 2.**—Apparatus assembled; spare sockets at each corner of arm rest allow location of syringes in most convenient position. **Fig. 3.**—Apparatus in use, on arm board without interference with surgeon; adjustable straps hold arm rigid; manipulation of syringes causes no movement of needle.

syringes and a few inches above the arm. The third outlet of the valve bears 6 inches of thin gum rubber tubing attached to a glass adapter, ground to fit the intravenous needle. For sterilizing, the pillar and attached syringes, tubing and stop-cock are boiled after being assembled, the plungers only being boiled separately. The whole injecting system is therefore sterile and ready for use when added to the arm rest. The complete apparatus is a single unit, and so solid that injection may be made with the arm at the patient's side extended on an arm board or steadied on the anæsthetist's knee. Even violent movement will not dislodge the needle: he may lift or turn the arm at any angle, but with it will go the needle and syringes, in the same relative position. With a little practice, it becomes quite easy to sit at the head, holding the chin with one hand and operating the valve and syringes with the other. Unfortunately the lower 6-inch tube holds approximately 1 c.c., and this presents a difficulty in manipulation which it has been impossible to overcome. It is necessary to inject 1 c.c. of anæsthetic, followed by 1 c.c. of saline to clear the tube: then 1 c.c. of anæsthetic, again cleared by saline, always stopping administration with saline in the tube, so that more saline may be kept running through the needle from time to time until more drug is needed. Either syringe may be refilled at any time without interfering with the needle, by disconnecting the short tube at the stop-cock, dipping the free end into the ampoule or cup of saline, and drawing the desired amount into the syringe. Contamination must be guarded against by the liberal use of alcohol on the fingers and tubing. The apparatus as shown is the result of repeated changes, dictated by trial and error. Each part has been selected and placed after rejection of alternative arrangements. In its present form it is quite satisfactory and may be duplicated in any amateur work-shop at small expense. It is doubtful if some of our longer operations could have been completed without the use of some such mechanism.

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CRYPTOMYCES PLEOMORPHA HAS NO ETIOLOGICAL RELATION TO CARCINOMA

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IN the January, 1935, issue of this *Journal*, Dr. O. C. Gruner[1] described a very interesting microörganism of the ascomycetes order and named it *Cryptomyces pleomorpha*. Owing to the fact that the organism was isolated from the blood and malignant tissue of a patient suffering from general carcinomatosis, and because it appeared to be unlike other members of the ascomycetes, differing in pleomorphism and cultural characteristics, the question arose as to its etiological relation to malignant disease. For this reason I undertook further experiments to prove or disprove such a relationship.

MATERIAL

1. Bloods of 50 cancer patients. Three samples were taken from each patient in 3 successive days at varying hours.

2. Forty-five specimens of malignant tissue, obtained immediately after the removal of the growth.

3. Animals—80 rats derived from two families; 20 mice, all from the same family. All animals were bred in the laboratory, and experimental work with other animals of the same families proved their susceptibility to tumour growth after transplantation of tumour tissue.

TECHNIQUE

1. Ten c.c. of blood were obtained from each patient by venepuncture under the most aseptic conditions. We transferred this blood to three flasks, each containing 20 c.c. of Gruner's asparagus broth medium. One flask was placed in the incubator at 37.5° C.; one was kept at room temperature; and the third was cultured anaerobically by the pyrogallic method at a temperature of 37° C. This process was repeated on three successive days at varying times. The cultures were examined and replanted every 48 hours for 8 weeks under rigid aseptic conditions, to prevent contamination. Gruner's asparagus agar medium was used for the replanting.

2. Each fragment of tumour tissue of each patient was cut aseptically into three parts, each of which was placed in a culture flask containing 15 c.c. of asparagus broth, and cultured in the same manner as was the blood.

3. Inoculation of animals.—

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Group I.—Rats—15 males and 15 females, ranging in age from 4 to 5 months, were inoculated as follows: 3 pairs intrapleurally; 5 pairs subcutaneously, in either the inguinal or axillary area; 2 pairs intraperitoneally; 5 females in the breast tissue; 5 males in the testicle. For this group we used for the inoculation a 24 to 48 hour culture of *Cryptomyces pleomorpha.*[2] Dose 0.5 c.c.

Group II.—Rats—15 males and 15 females, ranging in age from 8 to 9 months, were divided and inoculated as in group 1, excepting that the dosage was 1 c.c.

Group III.—Rats—20 males and 20 females, ranging in age from 11 to 12 months, were divided and inoculated as in the preceding groups, but with the addition of 5 females which were inoculated in the breast and 5 males in the testicle. For this group we used 1 c.c. of a 12-day culture.

Group IV.—Mice—10 males and 10 females, ranging in age from 6 to 7 months, were divided and inoculated as follows: 2 pairs subcutaneously, 2 pairs intraperitoneally, 6 females in the breast tissue, 6 males in the testicle. The dosage was 0.5 c.c. of a 48 to 60 hour culture.

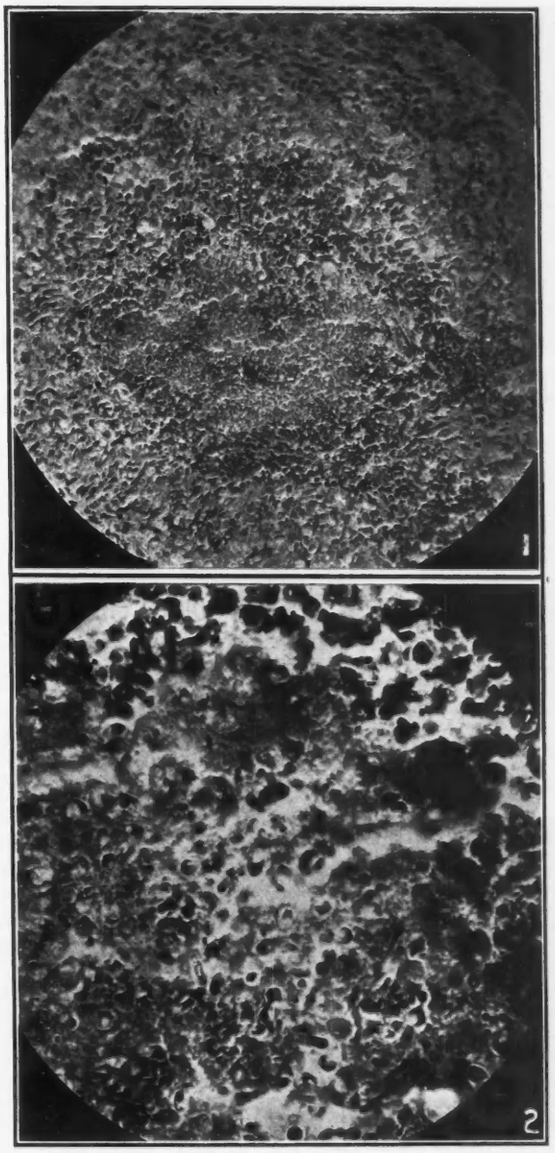
RESULTS

1. All the blood cultures remained sterile except for two which were contaminated with *B. subtilis.*

2. All the tissue cultures remained sterile except for 3 which showed a Gram-positive bacillus having the characteristic morphology of the diphtheroid group.

3. Animal observation over a period of 14 months showed the following points. Of those inoculated intrapleurally 2 died within 48 hours after inoculation. Smears of the blood and organs showed the megaspores with very refractive capsules. The lungs showed a pneumonic process. Of the 30 animals that were inoculated either intrapleurally or intraperitoneally, 20 died of general infection. The lungs of those inoculated intrapleurally and the livers of those inoculated intraperitoneally showed scattered abscesses. Some of the organs showed indurated areas, microscopic sections of which presented the arrangement of typical tubercles (Fig. 1). In the central necrotic area many refractive megaspores were noted (Fig. 2) and an occasional giant cell. The infiltration was predominantly monocytic.

Of those animals that were inoculated in the breast tissue, intratesticularly or subcutaneously, some presented indurated areas at the point of inoculation and some showed abscesses the pus of which contained the fungus. Within six weeks, however, there was complete absorption, with very faint scar formation, *i.e.*, complete recovery. The mice presented the same lesions as the rats. A progeny of a mouse that was inoculated in the breast tissue was perfectly normal and still living at the age of 9 months. The progeny of a Group II rat which was inoculated intraperitoneally died within 2 to 4 weeks after birth. The organism was isolated from the blood and every organ. Nine progenies derived from the rats that were inoculated either subcutaneously or in the



breast tissue showed no evidence of the disease.

Twelve months after inoculation, 35 animals of the various groups were sacrificed. Every organ was found to be in normal condition. The remaining animals are alive and well after 14 months' observation. The numerous sections taken from the animals that died, including those of the progeny, and those taken from the indurated areas of the animals inoculated subcutaneously, as well as those sections taken from the animals that we sacrificed, showed *no evidence of malignant infiltration.*

DISCUSSION

It appears that the finding of this microörganism in the original case was a mere coincidence. There are a large number of cases reported in the literature in which different fungi have been isolated from cancer lesions. I recall one very interesting case which came to my observation in a European clinic. The patient suffered from an unsuspected carcinoma of the lung. During an excess of coughing she expelled a thick sputum which contained yellowish granules resembling those of actinomycees. Microscopic examinations as well as cultures confirmed this. The patient died several days later, and the post-mortem revealed a primary malignant growth of the lung, replacing practically an entire lobe. Around this growth there were scattered abscesses which contained the fungus of actinomyces. No one could say with certainty which disease was primary, although in this case we supposed the mycotic infection to be the first, due to the fact that the patient lived on a farm and attended to cattle. If our supposition is correct, the fungus served as an irritating factor in a constitution already predisposed to malignant proliferation, for in this case there was a definite family tendency to cancer, the patient's mother having died of cancer of the breast and her brother of cancer of the throat.

So far there is no evidence to support the belief that any of the many parasites or bacteria found in tumour tissues are capable of producing the disease, except as remote factors.

CONCLUSION

Repeated cultures of the blood and malignant tissues of cancer patients failed to show any growth of the Gruner organism.

One hundred animals inoculated in different areas, and observed for a period of 14 months, failed to give any evidence of malignant proliferation.

The bloods and tissues were obtained from the Montreal General Hospital (Dr. Bazin and Dr. Barlow); Royal Victoria Hospital (Dr. Ballon and Dr. Archibald); The Woman's General Hospital (Dr. Bercowitz), to all of whom I am greatly indebted.

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THYROIDECTOMY FOR ANGINA PECTORIS: CASE OF ANGINA PECTORIS ASSOCIATED WITH NON-TOXIC GOITRE RELIEVED BY TOTAL ABLATION OF LEFT LOBE OF THYROID GLAND.—In the light of recent information on relief of angina pectoris following thyroidectomy Bisgard attempts to analyze the mechanism of relief in his patient who presented an unusual clinical picture of angina pectoris associated with an old substernal degenerated adenomatous goitre and with a hypometabolic state without symptoms of myxœdema. In consideration of a pre-operative metabolic rate of minus 32 (decidedly inaccurate), it seemed unwise to deprive the patient totally of thyroid tissue, and since the pain had always been confined to the left side it seemed probable in the light of the experience of Lyon and Horgan that it might be relieved by subtotal thyroidectomy, the left lobe, however, being removed completely. This procedure gave not only immediate but also prolonged (now eleven months) relief from angina pectoris, and the relief developed not as a result of hypothyroidism but rather in the presence of sufficient thyroid tissue to maintain a normal metabolic rate. No determinations were made of the rate of blood flow before or after operation, but if the metabolic rate is an index to the rate of flow, it is reasonable to assume that the velocity was increased rather than decreased. Disregarding this speculation, the fact remains that there has been prolonged relief in the presence of a normal metabolic rate and that a reduction in the metabolic demands on the heart has played no part. Interruption of the sympathetic nervous innervation of the left lobe of the gland obviously was accomplished at operation, and if this represents the mechanism of relief in this case it differs from that observed by Weinstein and his associates for abnormal sensory manifestations and attacks of angina pectoris did not return in a few weeks and have not recurred to date. Only by virtue that there exists direct nervous communication between the heart and the thyroid independent of the sympathetic or other nerve trunks and that these pass from the heart upward in the adventitia of the aorta, innominate carotid, and superior and inferior thyroid arteries can the author explain the prolonged relief of angina pectoris in his case and in the cases reported by Lyon and Horgan. No studies of sensitivity to epinephrine were made in his case. However, since there was at all times sufficient circulating thyroid secretion to maintain a normal metabolic rate, the theory of relief of angina pectoris from a reduction of sensitivity to epinephrine, as advocated by Levine, Cutler and their associates, seems inapplicable. It is probable that some change did occur in the interrelationship of the thyroid and adrenals, and equally probable in the interrelationship of all members in the endocrine system. In support of this contention are the changes that occurred after operation in the metabolic rate (an elevation from minus 30 per cent to minus 5 per cent) and in the metabolism of sugar, which shifted from pre-operative abnormality to post-operative normality.—*J. Am. M. Ass.*, 1936, **106**: 1639.

EFFECTS OF BETAINE UPON THE CHOLESTEROL AND BILIRUBIN CONTENTS OF BLOOD PLASMA IN DIABETES MELLITUS*

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BEST and his co-workers in Toronto have shown that deposits of fat in animal livers caused by feeding of either fat or cholesterol may be made to disappear by the administration of choline. These workers have also shown that choline is not only curative but can prevent this deposition of fat. In the interpretation of such experiments, however, consideration must be given to a variety of modifying factors. Composition of diet, for example, is a factor. Casein was found to exert a lipotropic action; with diets of constant protein content the degree of fatty infiltration was found to vary with the fat content of the diets; and with diets of constant fat content the degree of fatty infiltration was found, in general, to vary inversely with the casein intake. (Different proteins have different lipotropic values. Gelatine, for example, has none). Pure sucrose caused an increase of fat, whereas the addition of protein prevented this excess deposition. Dried yeast and certain yeast preparations used for their contents of vitamin B_1 were found to be lipotropic, and on analysis were found to contain choline; "marmite" contained as much as 3 mg. per gram. Initial height of the glyceride content of the liver is to some extent another variable. A brief summary of the experiences of these authors will be found in a recent communication by Best and Channon.[1]

A study of any large group of diabetics shows that people suffering from this condition are no less liable to diseases of the liver (cirrhosis, malignancy, infection, etc.) than non-diabetics. Disease of the liver, secondary to disease of the gall bladder, is perhaps more common in the diabetic than in the non-diabetic. This is suggested from the finding, both in Joslin's clinic and in our own, that about one adult in every four had some disease of the gallbladder. Hæmochromatosis is definitely more common amongst diabetics than non-diabetics. Here, as is well known, the diabetes is, as a rule, a secondary and terminal manifestation. Aside from these conditions, however, there is much to suggest that there is a causal, as well as an accidental, relationship between disease of the liver and diabetes, as the following observations show.

Enlargement of the liver is common amongst juvenile diabetics. Priscilla White[2] found palpable livers in 40 per cent of her cases, and, in one case, the enlargement was such that the lower border was found in the pelvis.[3] That such enlargement is due essentially to fatty infiltration is suggested from the writer's experiences with a similar case.

A girl, 17½ years old, a diabetic of 7½ years' duration and a patient in this clinic since 1929, was admitted to the hospital into the service of Dr. C. P. Howard on February 4, 1935, in coma. The liver edge was then found 19 cm. below the costal margin in the mid-clavicular line. She recovered fully from the coma, and the subsequent course was uneventful, except for the rapid recession of the edge of the liver, which was at the costal margin when she was discharged from the hospital on February 25th, 21 days after admission. She was re-admitted about three months later (May 29th) again with severe acidosis, but not in coma, and, at this time, the liver edge was found 23 cm. below the costal margin in the mid-clavicular line. Again, following control of the diabetes, the liver edge receded rapidly, and when she was discharged from the hospital on August 5th it was at the costal margin. She was re-admitted to the hospital nine days later (August 14th), and the liver edge was then found 10 cm. below the costal margin. With treatment, it again receded and was at the costal margin on her discharge from the hospital on August 26th. When she returned to the Out-door Clinic for Diabetes on September 10th, the liver edge was again found 10 cm. below the costal margin.

It is of interest here to note that fatty infiltration of the liver is readily produced in the completely depancreatized animal, and, as Best *et al.*[4] have shown, the condition is greatly exaggerated, in spite of insulin therapy, when the choline content of the diet is kept low. Fatty infiltration of the liver is also a common post-mortem finding in the human diabetic in death due to diabetic coma. In fact, reference to fatty infiltration is one of the oldest observations on the pathology of diabetes; Mead[5] first drew attention to it in 1784.

In 1926, the writer[6] drew attention to the

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high incidence of excess quantities of bilirubin in the blood of diabetics; of a group of 130 cases hyperbilirubinæmia was found in 30—an incidence of 26.1 per cent. Since then de termination of the bilirubin content of the blood has been a routine test in this clinic; and in a later investigation of a much larger group of cases (500) by Dr. A. C. Corcoran the incidence of hyperbilirubinæmia was practically the same. In a more recent investigation, which included 3,000 analyses, the incidence of hyperbilirubinæmia—more than 0.5 units—was found to be 27.4 per cent. This is shown in the following Table which is a brief summary of a more extensive Table of another report.[7]

Units of bilirubin (range)	*Number*	*Percentage*
−0.5	2,178	72.6
0.6−1.0	699	23.3
1.1−1.5	76	2.5
1.6−2.0	19	0.63
2.1−	28	0.93

Assuming that, in the absence of biliary obstruction and hæmolysis, excess quantities of bilirubin in the blood are due to hepatitis, these data afford further proof of the high incidence of impairment of liver function in diabetes mellitus.

Further suggestive of an intimate relationship between liver function and carbohydrate tolerance in diabetes are the experiences with diets. Himsworth,[8] by well controlled experiments, has clearly demonstrated that diets rich in fat depress, whereas, diets rich in carbohydrates improve, carbohydrate tolerance; and that diets rich in fats decrease, whereas, diets rich in carbohydrates increase, the sensitivity of the individual (animal or man) to insulin. From the observations of Himsworth it would appear that the explanation of these phenomena is to be found in the liver; but, perhaps, the most impressive evidence of the importance of the liver in the control of diabetes is the finding of Soskin, Allweiss and Cohen.[9] These authors have shown that if the blood sugar is kept at the normal level by administration of insulin it is possible to obtain perfectly normal blood sugar time curves in the completely depancreatized animal, *providing the liver is not disturbed.*

In view of the above observations, an attempt was made to determine the value of one of the derivatives of choline—betaine—in a group of diabetics who failed to respond to treatment in the usually expected manner with our high carbohydrate-low calorie diet.

As has been shown repeatedly by the writer, the high carbohydrate-low calorie diet which has been in use in this clinic for more than six years[10] leads, in the majority of cases, to marked improvement of carbohydrate tolerance,[11] and the experiences, in general, fit in with the above-mentioned observations of Himsworth. Like all other diets used in the treatment of diabetes, however, this diet has its failures. A careful study of these failures showed that, in the majority of cases, treatment had little or no effect upon the cholesterol content of the blood, whereas, as the writer has shown repeatedly[12] one of the most striking characteristics of the high carbohydrate-low calorie diet is an immediate and sustained decrease of plasma cholesterol. With this diet, also, as with the older methods of treatment,[13] it has been noted that the patients whose blood cholesterol were not normal have not done as well as those whose bloods contained normal quantities of cholesterol. Minor dietary indiscretions resulted in more prolonged hyperglycæmia; the insulin dosages were higher; and mild infections (colds, etc.) were more common and led to more prolonged hyperglycæmia than with similar conditions, but with normal amounts of cholesterol in the blood. Digestive disturbances commonly met with in the past with the high fat diets have also been noted with the new diet when the bloods contained excess quantities of cholesterol. Of particular interest here is the fact that in the majority of these failures the bloods not only contained excess quantities of cholesterol but also of bilirubin. The possibility, therefore, occurred to the writer that in these cases *constant exposure to excess quantities of cholesterol in the blood may have the same effects upon the liver in the human being as those which were found by Best and his co-workers in animals after feeding of cholesterol.**

An obvious difficulty in putting this idea to the test of experiment is that, unlike in animal

* Both Dr. L. J. Rhea and Dr. J. E. Pritchard, our pathologists, have been impressed with the fact that more recently at autopsies of diabetics they have not found the fatty livers which were common prior to the use of the high carbohydrate diet. Of interest here is also the report of a case of typhoid fever in a child of 8 years with marked enlargement of the liver due to excess cholesterol esters.[14]

experiments, the effects of cholesterol upon the liver cannot be determined directly; measurement of the size of the liver is of little or no value, since anatomical integrity and functional efficiency are not necessarily, and as a rule are not, synonymous. The only other evidence, clinically, are the results of tests of liver function and, as yet, these are not very satisfactory. Bollman and Mann[15] have shown that when liver tissue is reduced in animals by repeated lobectomy the first indication of liver failure is accumulation of uric acid in the blood. From other data it would also appear that uric acid is dealt with exclusively by the liver. Theoretically, therefore, it would appear that the effects of betaine feeding would best be observed by analysis of this blood constituent. Actually, however, from our own experiences with many thousands of tests, we have found the estimation of uric acid a very unsatisfactory test of liver function. The reserve capacity of the liver,[16] its ability to regenerate,[17, 18] and the fact that failure of one function does not necessarily imply failure of another, are some of the difficulties in the interpretation of data. This applies also to all of the other tests of liver function (galactose, lævulose, the phthalein tests, etc.). From our own experiences, at least, the van den Bergh reaction appears to be the most satisfactory qualitative index of early impairment of liver function. In this study, therefore, the effects of betaine feeding were measured by determination of the bilirubin content of the blood. The cases which were selected for this study included only those whose bloods not only contained excess quantities of cholesterol but also excess quantities of bilirubin.

In this report are recorded the experiences with ten diabetics, each of whom had been under observation for at least one year before and at least one year after treatment with betaine. No cases are included in which there were less than ten determinations of cholesterol and ten of bilirubin both before and after treatment. The betaine used was obtained from the Research Laboratories of the Eastman Kodak Company, Rochester, N.Y. (betaine hydrochloride—P. 345). In each case, the dosage was 0.5 gram, three times a day. No disturbing effects were noted with the drug at any time. The combined data are shown in the accompanying Table.

EFFECTS OF BETAINE FEEDING UPON CHOLESTEROL AND BILIRUBIN CONTENTS OF BLOOD PLASMA IN TEN CASES OF DIABETES MELLITUS

Cholesterol
(mgms. per 100 c.c.)

Remarks		*Period**	
		Before†	*After†*
Number of analyses		113	166
Cholesterol:	maximum	432	299
	minimum	151	161
	average	258	244
	o	122	118
	PE(m)	7.71	6.13
	PE$\underline{\Delta}$	9.8	
	$\frac{\underline{\Delta}}{\text{PE}\underline{\Delta}}$ =	1.4	

Bilirubin
(Units)

Remarks		*Period**	
		Before†	*After†*
Number of analyses		113	178
Bilirubin (units)	maximum	2.4	2.5
	minimum	0.2	0.2
	average	0.86	0.49
	o	0.28	0.32
	PE(m)	1.77	1.61
	PE$\underline{\Delta}$	2.4	
	$\frac{\underline{\Delta}}{\text{PE}\underline{\Delta}}$ =	15.0	

*Cases under observation for less than one year are not included.

†Cases with less than ten blood analyses in each period are not included-

o = Standard Deviation.

PE(m) = Probable Error of Mean.

PE$\underline{\Delta}$ = Probable Error of Difference between Means.

$\underline{\Delta}$ Ratio of Difference between Means to Probable Error of Difference.

$\frac{}{\text{PE}\underline{\Delta}}$ =

In order to simplify demonstration of the Ratio in the cases of bilirubin, the number of units is multiplied by 100.

It will be observed that the average concentration of cholesterol in the blood plasma after administration of the betaine was slightly less than that noted during the control period. However, when these average values are judged by their probable errors it is obvious that the difference found is of little or no significance, since the ratio of the difference to its probable error was 1.4 only. This does not, however, necessarily imply that the betaine was inert. In the interpretation of these data consideration must be given to the fact that the cholesterol content of the blood may not be a proper

index of the degree of deposition of fat in the liver. It should here be observed that when fatty infiltration of the liver was produced by Best and his co-workers in their diabetic dogs the condition was not reflected in the blood; there was no increase of blood fat. Another important observation of these authors was that though the choline administered led to disappearance of fat from the fatty livers, regardless of the method of their production (cholesterol or fat feeding) it did not have the same effect upon the cholesterol esters as upon the other lipoids. (This result was due in part to the large amount of cholesterol fed [1 to 2 per cent of diet]. Using 0.2 per cent, the effect of choline on the esters is much more marked.)*

That the betaine was not inert in the above-mentioned diabetics is suggested from its effects upon the bilirubin contents of the blood. It will be observed that in the 113 tests during the control period the average amount of bilirubin in the blood was 0.86 units, whereas, after administration of the betaine it was 0.49 units—a reduction of approximately 57 per cent. That the difference noted was significant is clearly shown by the ratio of the difference to its probable error $\frac{\Delta}{PE\Delta} = 15.0$. These data, therefore, justify the conclusion that the feeding of betaine in these cases resulted in improvement of liver function, at least so far as the metabolism of bilirubin is concerned. This conclusion is, of course, statistical. It, therefore, may, or may not, and need not necessarily, apply to an individual.†

From the combined data the writer has the impression that there has also been some improvement of carbohydrate tolerance, judging from the increase of carbohydrates and reduction of insulin dosages; and that the improvement paralleled improvement of liver function, judging from the reduction of the bilirubin contents of the blood. However, an impression is not proof and a much longer period of observation will be necessary, in view of the gain of carbohydrate tolerance generally noted with the high carbohydrate-low calorie diet.[11] The data are, however, very suggestive, in view of the fact that these cases were selected for this study because they were regarded as failures in their response to treatment.

It is of interest here to note that the average protein content of the high carbohydrate-low calorie diet is appreciably higher than that of the older diets of much higher fat and much lower carbohydrate contents. An interesting speculation, therefore, is whether, aside from carbohydrates improving and fats depressing carbohydrate tolerance, as shown by Himsworth, some of the improvement noted with this diet may not be due to its protein content, in view of the observation by Best and his co-workers that some dietary proteins contain an effective lipotropic factor. Should this be found to be so, it is obvious that, in the future, in the construction of diabetic diets consideration will have to be given not only, as in the past, to carbohydrates, fat, protein, etc., but, also, to the content of choline and its derivatives. The definitely proved harmful effects of cholesterol, and the tendency of certain fats to cause fatty infiltration more readily than others, may also have to be considered. Best (personal communication) for example, has found that beef dripping was more effective in producing fatty livers than butter. The experiences reported here, therefore, certainly warrant further investigation of the effects of betaine in human diabetes, especially in view of the fact that no harm was observed with the betaine, and that, compared with the dosage of choline which were used in the experimental animal, the amounts of betaine used in the above-mentioned cases were small.

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† It is of interest here to note that in their early experiments with fatty livers in animals, produced by feeding of fat and cholesterol, Best and his co-workers found large amounts of bile pigment in the urines, which disappeared after administration of choline. No tests were made of the bilirubin contents of blood. (Personal communication).

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THE UNSTABLE COLON*

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IT is an interesting but none the less regrettable fact that the medical profession generally does not regard purely functional disorders as worthy of serious attention. For centuries, the profession has been trained to believe that the smallest departure from normal function must be due to some objective pathological change which needs only a sufficient number of clinical and laboratory tests to demonstrate its presence. This tradition has become deeply entrenched in our medical teaching. The colon has suffered more than its share as a result of this medical apathy. We are content for the most part to accept the patient's diagnosis of chronic constipation, prescribe a high roughage diet with some moderately irritating laxative, and hope that the next time the patient comes he will have some really interesting complaints.

Within recent years, however, our knowledge of the physiology of the colon has increased materially. We know that this organ *has* useful functions to perform, if we will only allow it to perform them, that it is not the source of toxins which are readily absorbed and produce serious chronic diseases. We also know that the normal natural functioning of the colon is essential to continued good health and well-being. Therefore I think that the functional disturbances of the colon are well worthy of our interest and attention.

ANATOMY AND PHYSIOLOGY

We learn from comparative anatomy that man has an unusually short uncomplicated digestive tract, and we have abundant proof that only late in his development did he learn to use the products of the soil—primarily he was a hunter and fisherman. These anatomical facts indicate clearly that man's digestive tract was not designed for a diet containing excessive roughage.

The known functions of the colon are the absorption of water, the digestion of cellulose, the secretion of mucus, and the propulsion of its content from cæcum to rectum. The digestion of cellulose is a process of fermentation aided by bacterial action, and therefore it requires much more time than the rapid chemical reactions of digestion in the small intestine. The greater width of the colon and its sluggish activity are admirably adapted for this purpose, as for the absorption of water. We know from many experimental observations that these functions are carried out in the proximal colon, and that normally, this portion always contains food residues which by the time they reach the descending colon are practically dry and their bacterial content dead. Therefore if the colon is to carry out its proper functions the cæcum, ascending colon and transverse colon *are never empty*. This important point has an obvious bearing on the effects of laxatives on colon function.

Another point which has some bearing on our discussion concerns the innervation of the colon. The extrinsic nerve supply is double, through the sympathetic and para-sympathetic systems. We know that stimuli from the higher centres and cortex, and that conditioned reflexes are mediated through these nerves, but, unfortunately, we do not yet know the interrelation of the two systems. It was formerly

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thought that the para-sympathetics were motor and the sympathetics inhibitory, but recent experiments seem to indicate that both systems carry motor and inhibitory fibres, and that "the specific effect either of vagal or sympathetic stimulation on the intestine is determined, at least in part, by the initial tonic state of its musculature. Chemical substances liberated at the periphery may also play a rôle in determining the type of response." (Kuntz[6]).

After section of all extrinsic nerves, the bowel is still able to function (though not normally), due to the activity of the neuromuscular mechanism in the wall of the gut. The enteric nervous system is responsible for conduction within the wall of the digestive tube, for peristalsis in the colon, for tone, and for other reflex activities. It is, in fact, "a reflex system capable of independent coordinated reflex activity but subject to reflex motor and inhibitory influences through the central nervous system". (Kuntz). Thus it is evident that the functional activity of the colon depends on two main groups of factors—internal mechanical and chemical stimuli acting through the reflex enteric system, and external stimuli such as the emotions and conditioned reflexes acting through the vegetative nervous system and able to dominate the internal factors.

Definition and Terminology

At the outset we are met with a formidable array of terms—spastic colitis, spastic constipation, atonic constipation, tonic hardening of the colon, irritable colon, and so on—many of which are misleading and confusing. Thus, "colitis" should be confined to inflammatory conditions and, as it connotes in the lay mind a serious organic disease, should never be used in talking with functional patients. Also the term "irritable" is not satisfactory as it is usually understood to mean hyper-irritable. To avoid all confusion it has seemed desirable to find a term which would include all the functional disturbances of the colon, and then qualify that term should greater detail be necessary. Crohn, of New York, suggested "unstable colon" and this is now generally accepted. Unstable colon may be defined as a functional disturbance of the colon due to faulty correlation and coordination of its neuro-muscular mechanism, and evidenced by changes in tone, in irritability or in both tone and irritability. Associated with these motor disturbances there may also be secretory disturbances, the so-called mucous colitis—another misleading term which should be dropped. These secretory changes require no special treatment and they disappear when the colon reassumes its normal function.

Incidence

That unstable colon is a common condition is evidenced by the fact that in 3,000 consecutive admissions to the Lahey Clinic, Boston, Jordan and Kiefer[4] report 30 per cent as having no other lesion than this disturbance of bowel function. Spriggs[9] reports 50 per cent in his series. In regard to sex, females outnumber males two to one. The greater number of cases occur in adult life from the second to the fifth decade inclusive.

Etiology

The common etiological factors are divided into two groups—local and general. The local factors act directly on the colon having either a mechanical or a chemical effect which alters function; the general factors act either through the extrinsic nerves or possibly the blood stream.

Local factors.—(1) *Food.* There are two points about diet to which I would draw your attention. The first is *roughage.* While it is an undisputed fact that a certain amount of food residue is essential to provide the necessary stimulus for normal bowel activity, it is equally true, as we have seen, that the colon of man is not designed for excessive residue. A few hardy healthy individuals may be able to eat bran, cabbage and other roughage food and feel no ill effects. But with the vast majority the colon rebels. Distension and increased peristalsis may at first cause the illusion of improved function, but fatigue, loss of tone and increased irritability rapidly supervene and proper function disappears. Fear of obesity and misinformation regarding constipation have been responsible for the large amount of roughage used at the present time.

The second point about diet concerns *food allergy.* It has been shown that many persons are hypersensitive to certain types of food and that this manifests itself not only in disturbances of digestive function but also by systemic reactions such as headache, malaise

and urticaria.[8] When food allergy is suspected the patient is put on a basic diet of non-irritating foods, which is gradually increased until the offending food is discovered by the appearance of symptoms.[7] Skin reactions to food proteins have proved to be of little practical value in this condition.

(2) *Cathartic excess.* Spriggs reports that of 1,000 patients who showed colon delay by x-ray 764 complained of constipation, and of these 670 used laxatives—431 daily laxatives. The effect of laxatives on the colon is one chiefly of irritation. Food is rushed through the digestive tract, and the proximal colon which, as we have seen, is normally full and functions slowly over a period of days, is completely emptied of its partly digested content. In illustrating this point, Alvarez[1] has compared the colon to a railway siding which holds just three cars. Each day the engine brings along another car and bumps off one at the far end of the siding. Now if the siding is completely emptied of all three cars in one day, it will take three days for the siding to fill again and allow the normal routine to be resumed. This is what happens in the colon after a laxative. Most people do not wait for it to fill again before taking more medicine, and so the pernicious habit is established, without giving the colon a chance to function naturally. The resulting upset of colon function starts a series of digestive symptoms which often leads to prolonged ill health.

Apart from the local effects of catharsis there is also a general effect which is quite important. A natural normal bowel movement is accompanied by a sensation of relief and well-being amounting almost to pleasure. Psychiatrists are familiar with the exaggeration and perversion of this normal sensation in what has been called *anal eroticism*. Now in patients with unstable colon this sensation is completely lost. I have never observed a patient who was able to state that any sensation of this kind accompanied a bowel movement obtained by catharsis, in fact, the usual story is that they feel wretched after the bowel moves. The ultimate result is that these patients become irritable, cranky, annoyed by trifles. I remember one man who was forced to give up his business and retire because he was so irritable that he found it almost impossible to concentrate on his work and make reasonable decisions. He became even worse after retirement, but when natural bowel function was restored this irritability completely disappeared and he felt well enough to resume his business associations. I have observed this so often that I now regard the decrease of general nervous irritability and the return of normal bowel sensation as a criterion of improved colon function.

(3) *Colonic irrigations and irritating enemas.* Closely allied with the use of laxatives by mouth is the effect on colon function of the injection of irritating substances by rectum. Colonic irrigations have the same action in emptying the bowel as laxatives and are equally harmful. They are now used chiefly in association with dietary fads and are mentioned only to be condemned. The common soap suds enema is also irritating. Several years ago when doing some experimental work on the colon in animals, I took the opportunity of observing the effect on colon peristalsis of the injection of soap solution. The waves became greatly exaggerated and there was a marked longitudinal contraction. When the anus was partly obstructed (as it would be by painful spasm in the human) the movements were convulsive. Further, proctoscopic examination of patients up to 48 hours after a soap suds enema reveals an injected, irrritated, sometimes œdematous-looking mucosa. And yet in our hospitals almost immediately after abdominal operations these enemas are ordered p.r.n. It is a wonder that post-operative hæmorrhage and breaking down of sutures do not occur more frequently. I think it is almost as dangerous to stimulate violent peristalsis in this way after an abdominal operation as it is to prescribe castor oil in the presence of acute appendicitis. If it is necessary to cause a bowel movement, why force two quarts of irritating soap solution into the colon when all that is needed is a pint of warm saline or a few ounces of warm oil? Small non-irritating enemas have their place in the treatment of colon conditions —irritating enemas cause colon instability and should rarely if ever be used.

GENERAL FACTORS

As we have seen, it is difficult to evaluate the action of the autonomic nervous system on the colon, and, for the purpose of this discussion it would not be profitable to attempt to distinguish

between the actions of the sympathetic and parasympathetic divisions. Suffice to say that it is through the autonomic system that the cortical and sub-cortical influences are mediated. Due to the work of Cannon the effect of the *emotions* on the colon is well recognized. We all have experienced the purging effect of fear, anxiety and excitement. On the other hand, mental exhaustion, disgust and anger will stop digestive secretions and peristalsis leading frequently to nausea or vomiting. In view of these observations it is not surprising that so simple a thing as family rows during meals should be a cause of indigestion.

It is not within the scope of this paper to enter into a lengthy discussion of the many and varied psychoses and neuroses which may influence colon function. I will mention only two of the more common ones. The first is the fatigue neurosis. Overwork, worry and loss of sleep, leading to mental and physical exhaustion, form the basic factors. The digestive tract is affected almost from the onset—bowel function becomes irregular, and this is followed rapidly by such disturbances as abdominal distress, distension and gas. These individuals, now unpleasantly conscious of their digestive tracts, resort to laxatives, digestion becomes further impaired, general nutrition suffers with resulting loss of weight, anæmia, headaches and weakness. This leads to fear of organic disease, more anxiety and thus a vicious circle is established which often results in complete mental and physical breakdown. This type of neurosis is usually fairly acute and the response to adequate colon and nutritional therapy is satisfactory. A more chronic form of neurosis occurs in persons, mostly women, on whom the burden of every day life falls heavily. For years they have suffered from many ill-defined digestive complaints and have tried many doctors and drugs without relief. Physically they are often termed "poor specimens". They are undernourished, anæmic, nervous, and x-ray examinations have revealed varying degrees of gastro-enteroptosis, thus giving rise to the term "ptotic neurotic". The family history often reveals that close relatives have had nervous breakdowns or actual insanity. Sexual difficulties, marital unhappiness and financial worries are the common immediate causes of the trouble, and successful treatment must include psychotherapy.

Apart from these neuroses there is a large group of cases in which the vegetative nervous system appears hyper-active. These individuals suffer from what has been termed "sympathetic tyranny", and the clinical manifestations vary. In the colon this is evidenced in the typical spastic bowel, one of the most common causes of unstable colon.

I am not convinced that *abdominal adhesions* play any important part in the etiology of unstable colon—neither does *enteroptosis*. It is remarkable how adaptable the colon is to changes in position. I have investigated many patients previously diagnosed post-operative adhesions with partial obstruction, and have not yet seen one, with chronic symptoms, where there was any x-ray evidence of mechanical interference with colon function. Such cases present the usual findings of colon instability and respond well to medical treatment. I think most surgeons are agreed that it is a mistake to operate for adhesions unless there are very definite indications. In regard to ptosis it is interesting to note that quite frequently, after restoration of normal tone, the colon is found to be in its normal position. Supporting belts, pads, elevation of the foot of the bed, surgical procedures and other measures for the relief of ptosis do little if anything to help colon function, as it is the disordered function and not the ptosis which causes symptoms.

Faulty training in *defæcation habits* may upset colon function. The ideal time of the day for the bowel to move is immediately after breakfast, when the body is restored by sleep and the gastro-colic reflex activated by food. The habit of defæcation at this time can be established by conditioned-reflex activity and should be part of the general hygienic education of every individual.

SYMPTOMS

In a recent review of one hundred consecutive cases of unstable colon at the Lahey Clinic, I found the symptomatology to agree in general with that previously reported by Jordan and Kiefer. Nearly every patient complained of gas—either eructations or distension or both. Venous stasis in the sluggish bowel or in dilated loops and segments, with resulting passage of blood gases into the intestines, is the probable

explanation. Abdominal distress was the next most common complaint, occurring in 90 per cent of the cases—frequently the pain is shifting in character. Twenty-three per cent of all patients complained of nausea and vomiting, 18 per cent of loss of weight or of undernutrition. In regard to general symptoms, 22 per cent complained of headache, 12 per cent of loss of energy, 9 per cent of palpitation, 9 per cent of nervousness, 7 per cent of dizziness and 3 per cent of precordial or heart pain. These figures correspond with those reported by Spriggs for his series. In their various combinations, it may be stated briefly that the most common symptoms are epigastric distress with nausea and vomiting, generalized abdominal distress with gaseous eructations, distension and loss of appetite. Very often the symptoms are definitely related to bowel movements—an important diagnostic clue.

In practically every case the disturbance of colon function was evidenced by abnormal stools or the necessity of using laxatives. Many complained of infrequent, dry and difficult stools even with catharsis, others of alternating diarrhœa and constipation, and others of frequent mushy stools with or without catharsis.

SIGNS

In a general examination of the abdomen the physical signs of unstable colon are usually meagre. It is sometimes possible to palpate a contracted hardened descending colon or a dilated boggy cæcum, either or both of which may be quite tender. Not uncommonly there is generalized abdominal tenderness. *Examination of the stool* is important not only for the exclusion of organic disease but also for information regarding the amount, size and consistency—small dry hard lumps, or soft mushy stools are particularly indicative of disordered bowel function. *Gastric analysis* is important as a guide to subsequent treatment. About 15 per cent of patients were found to have achlorhydria, 9 per cent hypochlorhydria, and 12 per cent hyperchlorhydria, the majority being within normal limits.

By far the most valuable signs are obtained by means of x-ray examination with a *barium enema.* By using the following standard technique, the barium enema offers a comparatively simple and reliable method of appraising colon function: (*a*) the patient receives no laxatives or irritating enemas for 24 hours previous to the examination; (*b*) the barium solution contains 15 per cent of barium, and not more than 40 to 60 oz. should be injected; (*c*) the enema can is placed at a height of 30″ above the table; (*d*) the rubber tubing is ⅜″ inside diameter and the rectal tube a No. 30 French.

Under these constant conditions an estimate of the tone and irritability of the colon can be made based on the following criteria (Jordan and Kiefer).

1. The *rate of filling* is from 2 to 4 minutes, and the rate of progress of the head of the enema should be constant and uniform. Spastic contractions increase the time of filling and delay the progress of the enema. After evacuation of the enema the normal colon empties only about half of its content—complete emptying indicates spastic contraction, and retention indicates lack of tone or decreased irritability.

2. The *diameter* of the normal colon when filled varies in different portions — the lower descending colon and sigmoid are slightly narrower, the cæcum slightly broader than the rest of the colon. Apart from these variations the diameter should be generally uniform throughout. The diameter of the normal transverse colon is 4 to 6 cm. and of the descending colon and sigmoid 3 to 4 cm. (Spriggs).

3. The *length* of the colon is indicated by the presence or absence of redundant loops and the location of the flexures and cæcum. An abnormally long colon, the result of loss of tone, may be present when the cæcum is low and one or both flexures high, or when one or more redundant loops are seen.

4. In the normal functioning colon, *haustral markings* appear during filling in the sigmoid and descending colon, but they tend to be irregularly placed; in the proximal colon, however, they should be uniform in appearance and depth. The depth is about one-fourth of the colon diameter.

5. Normally the patient should experience during filling a desire to defæcate. Severe *distress* or colicky pains indicate increased irritability, and complete absence of sensation indicates decreased irritability. Thus, the *irritability* is judged by the rate of filling, the progress during filling, the presence of spasm and the occurrence of distress. The *tonus* is judged by the presence or absence of haustral markings, the length and the diameter of the

colon. Of the various combinations of these two factors the most common is that of increased irritability and decreased or mixed tonus.

On the basis of these criteria it becomes possible to appraise any marked variations in colon dynamics as indicated by changes in tone and irritability. In order to allow for variations which may be within normal limits, it is wise to base the diagnostic impression obtained from the barium enema on quite definite rather than any slight changes present. To summarize, I would suggest that the most important x-ray findings (barium enema) in unstable colon are (*a*) marked crampy pain during filling, (*b*) onset of distress during filling, similar in location and character to that originally complained of by the patient, (*c*) definite areas of spastic contraction, (*d*) marked changes in the rate of filling, and (*e*) almost complete emptying or retention after evacuation. When a barium enema cannot be obtained valuable information concerning the functional state of the colon may be gained from a film taken 9 hours after the ingestion of an opaque meal (Kantor[5]).

DIAGNOSIS

The final diagnosis of unstable colon is made on the history, symptoms, signs, laboratory and x-ray finding which have been described. We are dealing with a distinct and definite clinical syndrome which however, may simulate organic disease. It is therefore of prime importance to exclude the presence of organic disease both for the good of the patient, to enable us to reassure him, and of the physician, to prevent criticism of his professional ability. Somehow, it is usually considered a more serious error to diagnose functional disease in the presence of an organic lesion than it is to make a wrong organic diagnosis.

It must be realized that unstable colon is not an uncommon finding in association with organic disease. The inflammatory lesions of the gastro-intestinal tract (particularly appendicitis, diverticulitis and colitis) and many general systemic diseases (*e.g.*, thyroid disease) may indirectly cause unstable colon. The recognition of this in the treatment of these diseases will often influence very favourably the final result. For example, the combination of cholecystectomy and post-operative bowel management in cases where both gallbladder disease and unstable colon are present prevents later recurrence of digestive symptoms frequently blamed on common duct distension, adhesions, or other post-operative complications. I believe therefore that bowel management is a useful therapeutic test which should be used before considering a second abdominal operation based on an obscure diagnosis.

TREATMENT

Unfortunately, it is impossible to state that there is a simple specific treatment for unstable colon which rapidly and permanently restores natural bowel function. It is true that we have several clearly defined principles of treatment, but each case must be studied separately and the treatment varied accordingly.

The basic principles of treatment of this and many other medical conditions are well recognized. To quote the paraphrase by Wethered—"and now abideth diet, drugs and rest, these three, but the greatest of these is rest". Rest is essential, rest to the patient, rest to the colon, and it is to be obtained not only by cessation of mental and physical effort but also by physiological rest of the digestive tract through the use of diet and drugs.

Rest.—The advantages of a short period in hospital are many. The patient is kept at complete rest in bed for the first week and daily observations made regarding response to foods, bowel function and other details of the régime. The change of environment is beneficial to nervous patients, and in all cases the education regarding the régime and its relation to proper bowel habits is of great value. When, for any adequate reason, hospitalization is impossible, the patient must rest in bed at home, or, at least, reduce physical and mental activities to a minimum.

Diet.—The principle underlying dietary management is rest to the colon by the use of low residue non-stimulating and non-allergic foods. The amount and concentration are adjusted to the nutritional needs of the patient. During the first few days of observation the diet is limited to those foods usually included in a hospital bland diet, such as cereals, eggs and milk. The possibility of food sensitivity should however be considered from the onset of the treatment, and, if digestive symptoms continue

unabated on bland diet, it may be necessary to change to one of the elimination diets suggested by Rowe in order to discover the offending type of food. Fortunately, the foods of the bland diet rarely cause allergic manifestations in the digestive tract and they leave a minimum of residue to pass through the colon. Subsequent additions to the diet depend upon the clinical and x-ray findings, and the response thus far to treatment.* It will be noted that no irritating high roughage foods are included, and no raw fruits or vegetables (except lettuce). Diluted and strained fruit juices are permitted in the final diet. The fact must again be emphasized that the diet has to be adjusted to the requirements of the patient both in regard to digestive response and nutritional needs.

Heat is beneficial and most patients derive comfort and relaxation by the application of a hot water bottle to the abdomen. In addition, hot water should be drunk at intervals during the day. This hot water not only supplies heat but also an adequate fluid intake which aids colon function.

Drugs.—One of the most valuable drugs indicated in the treatment of unstable colon is *atropine*. Its action on the digestive tract is soothing, it tends to reduce secretions and relax muscle spasm. The dosage at first should be large enough to produce the typical physiological effects of the drug and then reduced. It is advisable to prescribe it for ten-day periods, with a free interval of five days.

Sedatives are indicated when the patient is nervous, apprehensive or unable to sleep. Small doses of pheno-barbital or other mild sedative given after meals during the first week or two of treatment quiet the nervous system and restore the confidence of the patient. All such drugs are to be used only as a "crutch", to be discarded as soon as the general condition improves.

Tonic mixtures, particularly those containing strychnine, should be omitted. Alkalis are useful if hyperchlorhydria is present, and dilute hydrochloric acid, if there is achlorhydria.

The patient must be cautioned to avoid all laxatives, irritating enemas and colonic irrigations. This should be explained in detail because many people do not consider mineral oil, milk of magnesia, psyllium seeds, etc., as laxatives. The various tablets and mixtures commonly used for the treatment of colds also contain laxative drugs and should be omitted.

Psychotherapy.—In reviewing the etiology of unstable colon the frequent association of this condition with nerve fatigue and imbalance of the autonomic nervous system was discussed. It is of great importance therefore to reassure the patient and to allay as far as possible the fears, anxieties and worries which are making life a burden. Many of these patients have been told that nothing is wrong with them, and yet have remained convinced that some hidden organic disease is causing their indigestion. After a thorough investigation, the patient must be impressed with the fact that no organic disease is present but that a very definite cause for the symptoms has been found. To most patients such a statement brings a feeling of great relief. At last a *cause* has been discovered—something *is* wrong—something which can be treated in a definite manner with reasonable hope of relief. We must educate these patients, explain the physiology of bowel function, tell them how laxatives and coarse foods upset the neuromuscular mechanism, how fatigue, worry and emotional explosions disturb digestion, and thus gain their confidence and cooperation.

Bowel function.—The frequency of the bowel movements, the size, shape and consistency of the stools should be recorded until normal function is restored. The chief complication to be avoided is fæcal impaction. Repeated rectal examinations should be made during early treatment, especially if no bowel movement has occurred for several days or the stools have been small and dry. If a tendency to impaction is noted a small retention enema may be given at bedtime and retained all night. Three ounces of warm oil, preferably of the non-irritating corn or cottonseed variety, used in this way prevents impaction and aids satisfactory elimination. Occasionally however, it may be necessary to resort to a larger enema consisting of three pints of warm saline in order to clear the lower colon.

The patient must be encouraged to form the habit of moving the bowel regularly. In view of the low residue diet the stools will be small and the patient should be told that he "cannot emulate the cow but he can be content with the modest output of the equally healthy sheep" (Eve). It may be necessary to use the oil

* A more detailed description of a low residue diet is given in Alvarez's excellent little book[1] on "Nervous Indigestion".

retention enema occasionally in order to assist in establishing normal colon rhythm, but there is no substitute for the patient's own effort to obtain a natural bowel movement. If there is marked weakness of the abdominal muscles regular trunk-bending exercises should be prescribed. The patient should be advised to undertake no form of exercise which causes physical exhaustion, but should be told that some exercise is necessary each day after the preliminary period of treatment.

In my experience, surgery has no place in the treatment of unstable colon. In the series of cases which I reviewed no less than 28 per cent had had abdominal operations without relief of symptoms. Appendicitis was the most common pre-operative diagnosis, gallbladder disease next, and in many instances the patients were subsequently told that no disease had been found. In addition, over 5 per cent had submitted to a second operation for adhesions. It is certainly a mistake to explore a patient with unstable colon unless the indications of supervening organic disease are very clear and definite.

PROGNOSIS

Generally speaking, the prognosis is good, especially if it is possible to obtain the intelligent cooperation of the patient. Relapses may occur from time to time and are almost invariably due to persistent dietary indiscretions, to careless bowel habits, or to nervous fatigue. It is necessary for patients to follow their régime closely for several months before experimenting with forbidden foods. Some find it essential to continue indefinitely in order to avoid symptoms—others rapidly disregard all dietary restrictions without loss of normal bowel function or return of indigestion. It is important for the patient to know that he must revert to strict régime as a measure of prevention during periods of unavoidable stress, during acute infections, and when there is any recurrence of symptoms.

CONCLUSIONS

Unstable colon is a functional disorder which presents a definite clinical syndrome. The most valuable laboratory data for diagnosis are obtained from the barium enema when carried out under constant conditions. It is a very disabling condition and successful treatment depends on reassurance, rest to both the patient and colon, and education in bowel hygiene.

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USE OF FEMALE BITTERLING AS TEST FOR MALE HORMONE.—In the attempt to determine the cause of a positive reaction of the ovipositor in the bitterling to the hormones circulating in urines Kleiner, Weisman and Mishkind tested many substances, including crystalline theelin and theelol as well as various proprietary hormone preparations, including a number œtrogenic in nature. As a result of these tests they arrived at the hypothesis that the responsible factor was not one of the female sex hormones but one of the so-called male hormones. Since the ovipositor stimulating substance or substances are added to the water in which the female fish swims, it would appear that she reacts to a hormone contributed from a source outside her own organism. That this source might be a male bitterling would seem likely, since the lengthening of the ovipositor occurs normally as a part of the reproductive cycle in the spawning season and when the female is in close association with the male. When the breeding season occurs it is probable that the male secretes his hormone and excretes it into the water near the female. She is thereby stimulated to react by a lengthening of the ovipositor, through which the ova pass when being deposited at their natural site. This hormone mechanism would insure the presence of a male in the neighbourhood of the female at spawning time. Naturally this hypothesis presupposes that the male hormone of the fish and that of man have similar activity. In brief, the male hormone furnishes the necessary stimulation to induce ovipositor elongation in the female. The male hormone present in male urine, presumably androsterone, produces the ovipositor lengthening reaction in the female bitterling. The anterior pituitary-like hormone does not give this test. Fractions containing theelin and theelol, and these crystalline hormones themselves, do not give this reaction or do so in a very slight degree. The authors recommend the use of this reaction as a new test for male hormone. In order that the test may be used in a uniform manner by all, they suggest a procedure and at the same time define a unit as follows: One bitterling unit is the smallest amount of material which, when added to an aquarium containing two female bitterlings in 4 litres of water, will cause marked lengthening of the ovipositor (to the end of the anal fin or beyond) in at least one of the two within forty-eight hours. Other necessary conditions are: (1) the fish must have been in the test aquarium for from 18 to 24 hours before the suspected material was added, and (2) at least half of the water used should be taken from the stock tank. The simplicity of the bitterling test should make it of great value in the isolation and purification of male hormone. It should also aid in the establishment of a definite clinical diagnosis of many endocrine disorders.—*J. Am. M. Ass.*, 1936, **106:** 1643.

TUBERCULOSIS AND THE STUDENT NURSE

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A CONSIDERABLE literature has accumulated on the problem of tuberculosis among student nurses. In this discussion an attempt will be made to correlate the expressed opinions of various writers on this subject. Perusal of the available literature points in the main to a high incidence of pulmonary tuberculosis in these young women. It would be difficult to state just how serious the problem has become, because the investigators vary in their conclusions. Undoubtedly many factors are to be considered—the general morbidity and mortality from tuberculosis in the area surveyed, age and physical condition of the student nurses; their living conditions, with especial reference to overcrowding; classification of the patients admitted to the hospital in question; and the care taken in segregating those with tuberculosis.

The members of the Canadian Hospital Council felt that a thorough study of the health of the student nurse was essential, and appointed a committee under the leadership of Dr. R. T. Washburn.* Our own assignment covered a special study of tuberculosis, a piece of work already under way in 1930.

During this year we were impressed with the value of the material available for a study of tuberculous infection and disease in the student and graduate nurse. As a result, several lines of activity were initiated. Inasmuch as we had no follow-up of the students who had completed the course in tuberculosis from 1924 to 1930 we decided to contact every one. We finally succeeded in tracing all. This would never have been possible without the hearty support of the superintendents of the various training schools, the Department of Health through the travelling diagnosticians, and the individual medical practitioners.

From June, 1930, the following plan of investigation was instituted. Every student on admission to our hospital was subjected to the following routine: an adequate family history with special reference to tuberculosis; a past personal history of infections, surgical procedures, anæsthetics, etc., weight variations during the five years preceding the examination; sleeping and eating habits; exercise and fatigue. A general physical examination, followed by postero-anterior and lateral x-ray films, was also routine. It was felt that the lateral films would give a better view of the root glands, and they were utilized to determine evidence of replacement calcification in these areas. All student nurses whose films showed suspicious-looking areas were re-examined at intervals during the two months' course, and in some instances we asked for further skiagrams during the later period of observation. Universal tuberculin testing, using 0.001 mg. and 0.01 mg. old tuberculin (Lederle, freshly diluted) by the intradermal method, was carried out on admission, and, if negative, on completion of the special training in tuberculosis. In order to complete our whole picture we have carried out a yearly follow-up of every student who has finished the course.

It was necessary to divide the work into two phases, 1924 to 1929 and 1930 to 1934, inclusive. We will report on a total of 358 undergraduate nurses during the first period, and 285 undergraduates and 48 graduates nurses, the latter group in the newly instituted graduate school. When we refer to tuberculosis in the sense of morbidity and mortality the combined figures are used. Where we mention specific data on tuberculin testing, weights, other contagious and infectious diseases we refer to the later period, 1930 to 1934. Inasmuch as a wide difference of opinion exists as to the morbidity from tuberculosis in student nurses, as compared with that found in young women in other occupations, we have applied the same experimental method to

* Tuberculosis in the Nursing Profession, Bulletin No. 18, Canadian Hospital Council, 1935.

the survey of normal school students, and a subsequent follow-up for the period of 1930 to 1934. We are fortunate in New Brunswick in having available the material from a yearly survey of normal school students who are examined and x-rayed, under the direction of the Department of Health, by the travelling diagnostician. This was introduced in 1928. We have also gathered data from the various maritime training schools in nursing affiliated with our institution. Of this number, 285 had taken the special course in tuberculosis and 431 had not. Finally, to complete the picture, we have secured from seven Canadian sanatoria the incidence of tuberculosis in their graduate nurse personnel. The data from this source cover the same period, from June, 1930, until June, 1934, and are therefore comparable.

Age.—We found that 93.3 per cent of the student nurses were in the age-group 19 to 24 years; 75 per cent of the graduates in that of 22 to 27 years; and 93 per cent of the normal school girls, in that of 17 to 19 years. We would like to stress this point, because our own Provincial statistics of 1931 give us these very interesting data. The death rate in the 15 to 19 year age group was 124 per 100,000 and comprised 56.5 per cent of the total deaths from all causes; and in the 20 to 24 year group, 172 per 100,000, 67.7 per cent of the deaths from all causes. We all recognize this dangerous age period, 15 to 24 years, and we note that the student nurse, the graduate nurse (post-graduate course) and the normal school students fall within, or very near, to this period.

Residence.—It may be said that a large majority of our nurses in training and normal school students are from towns, villages and country districts, but few from cities.

Weight and general nutrition.—These data were not complete but were as accurate as could be obtained in 297 of the 363 student and graduate nurses. The maximum and minimum weight during the five years preceding the course, the weight at the beginning of the probation period, and any marked variation during the training were noted. It was found that 80.5 per cent had gained and 19.7 per cent had lost weight during their training (up to the twenty-second month). The average gain was 19 pounds. It would seem obvious from this that a large majority of the nurses, under supervision, gain weight. This same feature is well recognized in troops in training, and would indicate that routine work, adequate diet, and freedom from immediate worry, bring about improved appetite and nutrition.

Fatigue.—We did not get the impression from our histories and personal observation that in the main these young women were markedly fatigued at the end of the day's work. It was found that the average number of hours of sleep was approximately seven, and a history of insomnia was evident in less than 10 per cent of the total number. We certainly can present no sufficient evidence to prove that the student nurses in our group developed tuberculosis as a result of malnutrition, fatigue, infectious disease, operative procedures or lack of physical rest.

Family history.—We were particularly interested in the question of contact with open tuberculosis in the family, and the following data were secured.

285 Undergraduate nurses	*48 Graduate nurses*	*960 Normal school students*
Family contact 27 or 20 per cent 1 contact with school teacher	3 or 6.3 per cent	76 or 8 per cent

We feel that a certain percentage of the nurses were not certain whether or not tuberculosis existed in their families, or that possibly they wished to conceal the fact. It is most difficult to be certain of the accuracy of those percentages.

History of pre-existing tuberculous disease.—From the histories, the following data were secured:

Tuberculous adenitis (scrofula)	*Pleurisy with or without effusion*	*Erythema nodosum*	*Definite parenchymatous disease*	*Total tuberculous disease*
Undergraduates 4	14 (4.9 per cent)	2	1	21 (7.4 per cent)
Graduates 4		0	1	5 (10.4 per cent)
Normal school 27 (2.8 per cent)		0	1	28 (2.9 per cent)

In other words, 7.4 per cent of the undergraduate nurses gave a definite personal history of disease that may be interpreted as being due to the tubercle bacillus before entering a training school. One may criticize these figures, and I believe rightly so. There can be little doubt that the diagnosis was correct in the tuberculous adenitis cases—the history and the evidence of scars were sufficient. Our greatest difficulty was the proper interpretation of dry pleurisy. We felt that so far as the nurses were concerned they were convinced that they had definite pleurisy. It was of such an outstanding nature that they remembered the pain, shortness of breath and fever continuing for several days. The effusion cases were quite definite and were not associated with pneumonia.

It is notable that the normal school student gives a much lower percentage of pre-existing tuberculous disease. The same possibilities were present in both, and it may be concluded that a more careful history was available from the nursing groups.

The most interesting feature of this group with historical tuberculous disease was that only one later presented activity during the ten-year study.

Reaction to tuberculin.—It is well to remember that the student nurses in this survey were not tuberculin-tested until after they had spent an average of 22 months in general hospitals; and the graduates, from two months to several years after graduation. The skin testing was carried out in one class of normal school students at the end of two months training.

root glands or lung parenchyma did not react to either of these dilutions.

Physical examinations.—We shall pass over this phase of the work as we soon found that our tuberculous disease in most instances was detectable only in x-ray films of the thorax.

X-ray examinations.—As stated before, the use of posterior-anterior and lateral exposure was universal, because we felt that such procedure would more clearly determine the question of calcification in the parenchyma of the lung and in the root glands. Due allowances were made for blood vessel shadows and artefacts, and a final decision given in only those presenting what is commonly considered reasonable evidence of replacement calcification. It was found that 56 per cent of the x-ray films on nurses at the beginning of their course in tuberculosis gave evidence of this pathological change, compared to 52 per cent of the graduate group. If the observation that calcification of the above type indicates tuberculous infection, then we may conclude that a fairly high percentage had passed through this phase of their disease.

We found that of the nurses who subsequently developed active disease 5, or 13.1 per cent, gave evidence of calcification in the intrapulmonary areas or in the root glands. Special note of this observation is made because it has been stated that individuals demonstrating such x-ray films are more prone to subsequent breakdowns. The evidence in our nursing population certainly does not confirm this. In 9 of the 38 nurses who subsequently developed active dis-

	Positive reactions on admission to course	*Negative on admission. Negative on discharge*	*Negative on admission. Positive on discharge*
Undergraduates	0.001 mg. 0.01 O.T. 165 65 – 84 per cent	0.01 Neg. O.T. 19 – 7 per cent	0.01 Neg. O.T. 26 – 9 per cent
Graduates	42 5 – 98 per cent	0	1 – 2 per cent
Normal school students	0.001 mg. 42.5 per cent		

After twenty-two months of training in our Maritime general hospitals, 84 per cent of the student nurses reacted positively to tuberculin, and at least half of the negative reactors became positive at the end of the special course in tuberculosis. Ten, or 3 per cent, of the students whose x-ray films showed calcified areas in the

ease we felt that we were justified in stating that the condition was latent. (We interpreted latency in the terms of practically obsolete disease, but we now know that activity was "just around the corner").

Again, checking over the instances where no definite diagnosis was made, but where there

was a suspicious-looking x-ray film, not one of these persons has developed disease. In other words, experience taught us that a diagnosis could only be made with some definite localized shadow, and could not be made on increased thickness of linear shadows or increased vascularity. In several instances a diagnosis was made of active disease, and these nurses were immediately taken from their work and placed on treatment. It may be said that in nearly every one the symptoms were few and the x-ray was the final court of appeal.

X-ray films on 6 others were considered positive, the diagnosis being made on small localized areas. Not one of these persons had a single symptom, except for a sequence of events that we have learned to heed. They were well nourished, healthy girls. They were allowed to continue their work under supervision, and at the end of two months were re-checked for further evidence of activity. The superintendent of their own training school was advised about their condition, yet in every instance they subsequently had a breakdown. This brought us to the conclusion that a positive x-ray of disease, irrespective of size, is enough evidence for the immediate placing of such persons under treatment. It proved conclusively to us that in this particular age-group any evident tuberculous disease is serious.

We are left with 15 nurses, in ten years, who developed tuberculosis during or following the special training in tuberculosis. By no stretch of the imagination, either from symptoms, physical or x-ray examination, did they present evidence of active disease on their first examination. However, at the time they began their course all had positive reactions to tuberculin. It is interesting to note at what time these nurses developed their active disease. It is evident that in the majority it became active during the course or within six months of its completion.

It was felt that a clearer picture of the problem of tuberculosis in student nurses could be obtained if data were available on all over the period of their training and one year after graduation. The superintendents of nurses in the various affiliating institutions gave splendid cooperation. Seven affiliating hospitals during the period of 1930 to 1934 had a total student population of 616. Of this group 285 came to us for special tuberculosis training. Of this total number (616) 19, or 3 per cent, could not complete their period of probation because of active or suspected disease; another 25 (3.5 per cent), fell by the wayside before the twenty-second month; and 1.6 per cent developed tuberculosis during or following the two months' affiliation at the Saint John Tuberculosis Hospital (up to the end of the observation period). Therefore 7.1 per cent of the nurses in training and after graduation developed active disease during a four-year period. In contrast, of the 691 nurses taking the special training in tuberculosis, that began on an average at 22 months, 38, or 5.5 per cent, were either found to have disease at the beginning of their special training or developed activity during the subsequent ten years of observation.

A four-year follow-up of normal school students inclusive of those discovered with tuberculosis in the surveys of the years 1930 to 1934 presented us with a total of 39 breakdowns, or 4.1 per cent, in this group. Finally, data secured from eight Canadian sanatoria on 394 graduate nurses of all ages, but mainly in the 25 to 30 year age group, accounted for a total of 15 nurses (4.07 per cent) who developed tuberculosis during the same period, 1930 to 1934 inclusive.

It would appear that the highest incidence of active disease occurs during the early months of training, and presents a distinct problem in itself, because there is a considerable elimination of the nursing population from this disease alone.

DISCUSSION

Braeuning[1] found the presence of active tuberculosis in 15 out of 18 nurses (83 per cent) who had spent some time in the nursing of patients with this disease. He was also of the opinion that 15 to 30 per cent of activity could be traced to their occupation, in other words, exogenous infection. He considers that a lack of knowledge of the disease as being infectious, bad hygienic surroundings in certain sanatoria, and inadequate disinfection of cooking utensils and dishes were responsible. Much[2] reports on the physical condition of 4,284 nurses and nuns, and states that 150 had developed tuberculosis in thirty-seven years. Until 1918 only 1 per cent had been discovered, but since that time 4.6 per cent developed the disease. The highest incidence occurred in the 20 to 24 year age-period. He attributes the increase to overwork and lowered resistance from other infections. Kirchner[3] reports 1.44 per cent of 14,140 graduate nurses developing tuberculosis, and further presents the following interesting data. Nurses employed in general hospitals break down at the rate of 1.36 per cent of their total population, against 1.89 per cent in institutions for the treatment of tuberculosis and 2.44 per cent in outdoor medical clinics.

Heimbeck[4] considers that fully 12 per cent of student nurses in the Oslo General Hospitals finally developed clinical tuberculosis. Whitney,[5] basing her conclusions on work done in Chicago and San Francisco, estimates the incidence of tuberculosis among nurses in training, one-third higher than among women of the same age-group in the general population. Shipman and Davis[6] found that 2.1 per cent of pupil nurses in the University of California Hospital developed tuberculosis. Meulengracht,[7] in a study of illness in student nurses in the Danish Schools of Nursing found from 5 to 6.72 per cent with tuberculosis. Greer[8] reports 4.5 per cent of the same population in the Ancher Hospital of St. Paul had developed the disease from 1920 to 1928. He points out in his excellent article the marked increase in the number of positive tuberculin reactions after six months' training. One hundred and forty-three out of 147 were positive, whereas only 33 or 0.3333 per cent were evident on admission.

Jacobson[9] reports an incidence of 5.21 per cent of tuberculosis over a period of five years. Kristenson[10] states that the incidence of tuberculosis in student nurses is higher than in cooking school teachers in the same institution, and that those who reacted negatively to tuberculin on admission became positive about ten months later. Seventeen per cent of a group of 126 young women in training developed some form of tuberculosis, and of that group, 75 per cent of the cases occurred during the first year. He also makes the interesting observation that pupil nurses whose parents were tuberculous, or who had a definite history of contact in childhood, showed less morbidity than others, and, further, that of the students with positive tuberculin reactions at the beginning of training few developed tuberculosis. Bechshoft,[11] on the other hand, reports a total of 1.8 per cent in 341 student nurses in the Copenhagen City Hospital developing tuberculosis in five years. Myers[12] has given an excellent summary of the literature pertaining to this subject, and expresses the opinion that a considerable percentage of such breakdowns are due to exogenous infection received during training. Ross[13] and Stewart[14] felt that the number of nurses who develop tuberculosis is far greater than the expectancy in the general population in the same age period. They also feel that nurses head the list of employed women in breakdowns from tuberculosis in their province (Manitoba). The majority of the nurses developed clinical evidence of the disease either during training or shortly afterwards, and 6 per cent of the nursing personnel in Manitoba have developed active tuberculosis during the four years of the observation. Ferguson,[15] of Saskatoon, in a recent communication estimates that approximately 1.3 per cent of the nursing population developed active tuberculosis during a period of three years, or eight times the incidence found in 3,376 normal school students, mainly young women in the same age group.

This accumulated evidence points to a considerable incidence of tuberculosis in the student nurses. It is not quite so obvious why there is such a wide variation in the reports. The explanation that naturally comes to one's mind is a wide variation in the extent of exogenous infection during training. Hospitals with but a few patients with open tuberculosis would, naturally, carry less probability of infection. Institutions with immediate and rigid surveillance of incoming patients, eliminating or segregating the infectious, would also prove safer places for the training of nurses.

From our own observations we were not impressed with the importance of malnutrition as a factor. This was evident from the gain in weight of the majority of nurses in training. We are convinced that their dietary was adequate, and have been confronted with the anomalous situation of active tuberculosis occurring in the apparently healthiest of our nursing population. Over-crowding may have been a factor influencing the onset of disease in a few of our nurses, but it was not evident in the remainder. With decreasing hours of labour, excessive fatigue should not be a factor, and we have obtained no evidence that our student nurses were rendered less resistant by this alone. Various other infections seem so far removed in point of time from the breakdown that we could not associate this factor with the final illness. Further, it is interesting to note how well the nurses with historical tuberculosis stood the strain of training, and that only 13 per cent of those with demonstrable calcified parenchymal or root-gland lesions swell the ranks of the ill.

We would like to suggest the viewpoint, as the result of our study of the student nurses over a ten-year period, that subsequent reinfection in young women who demonstrated evidence of childhood infection, as indicated by the x-ray appearance and positive skin tests does not eventuate in clinical tuberculosis to any great extent, but that what may be operable is a primary infection acquired early in training, with rapid, repeated and probable massive infections, eventually producing the more or less acute adult type of tuberculosis so often seen in nurses. This primary infection may pass unnoticed. We are all aware of the fact that many children, followed from the time of known contact until they eventually demonstrate a positive tuberculin reaction, may be asymptomatic and present nothing diagnostic of the so-called "primary complex".

What evidence we can secure in New Brunswick leads us to believe that the student nurse and recent graduate have a somewhat higher incidence of active tuberculosis than the normal school student (young women), or the older graduate nurse in sanatoria, but the difference is not so great as at first was supposed. We must remember that the student nurses are in a

class by themselves, in that they are more frequently examined than any other group of employed young women. Vital statistics available do not place the nurse in an unfavourable position regarding tuberculosis mortality. Deacon, in a study of mortality from tuberculosis in Michigan, found that school teachers have a specific death rate of approximately 40 per 100,000, and that of nurses is 12 per 100,000. Recognizing the problem, and feeling as we do that exogenous infection is of considerable importance in the subsequent history of tuberculosis in our nursing population, it seems obligatory upon all hospitals to take measures for reducing the incidence of tuberculosis to the minimum.

It is difficult to arrive at a practical solution of the problem, but we believe the following suggestions should be carried out by the hospital and training schools.

(1) Non-acceptance of young women into a training school, unless the medical staff of the particular hospital related thoroughly examine and x-ray every applicant. We feel that this measure would greatly reduce the breakdowns during the probation period. (2) It would be sound policy to introduce tuberculin testing (probably intradermic) as a routine measure for all applicants, and in districts with a high incidence of early infection to eliminate the non-reactors. (3) A full explanation of the communicable nature of tuberculosis should be given to incoming students and adequate routine protective measures insisted upon. (4) Consider every patient with a cough, entering a hospital, as potentially tuberculous, until proved otherwise, and special precautions should be taken to protect the nurse. (5) Isolation of all persons in a general hospital who have open tuberculosis. (6) Believing that the important portals of entry are the mouth and nose, equip the nurse with sufficient gauze, or, still better, light cellophane masks, to protect these portals. On this point we would like to say that since November, 1933, we have used masks on every nursing attendant in contact with patients. Plainly marked gauze masks were used, but later we introduced those of light cellophane which can be worn but in one way. They are daily exposed to ultra-violet light for sterilization. (7) More adequate arrangements for frequent hand washing. (8) Frequent change of nurses' gowns. (9) A half yearly review (x-ray) of the nursing personnel, or more frequently if symptoms such as fatigue, loss of weight and appetite occur. We should thus be in a better position to obtain good results from treatment.

CONCLUSIONS

1. A survey of undergraduate nurses is presented, and indicates a considerable incidence of active tuberculosis.

2. A high percentage of breakdowns occur during the first two years of training.

3. It seems evident that exogenous reinfection is an extremely important cause of breakdowns.

4. Evidence is presented that seems to indicate a high incidence of tuberculosis in both normal school students (later teachers) and graduate nurses in sanatoria.

We wish to thank the Department of Health, the superintendents of nurses of the various affiliated training schools who so kindly supplied the statistical data regarding their own personnel, and the medical superintendents of the Canadian sanatoria for the data on graduate nurses employed in their institutions.

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TUBERCULOSIS AMONG HOSPITAL EMPLOYEES. — A. Gullbring gives an account of the tuberculosis rate among the employees working in his tuberculosis hospital in Sweden between 1918 and July, 1935. During this period tuberculosis developed in 45 members of a staff of 2,016 (2.2 per cent). When the hospital's employees were classified according as their work did or did not bring them into contact with the patients, it was found that the tuberculosis rate among the former was 2.6 per cent, and only 1 per cent among the latter. Since 1928 all the younger members of the staff have undergone the intracutaneous tuberculin test on joining the hospital, and 20 per cent of them have been found to be negative reactors. The subsequent tuberculosis morbidity among the negative and positive tuberculin reactors was 8.4 and 2.8 per cent respectively—findings confirmatory of those of Heimbeck at the Ullevaal Hospital in Oslo, where the chances of a negative reactor developing tuberculosis have been found to be comparatively high. The author's observations do not, however, tally in every respect with those of Heimbeck.—*Nord. Med. Tidsskrift*, Jan. 4, 1936, p. 14).

THE SEDIMENTATION TEST IN PULMONARY TUBERCULOSIS*

(A REVIEW OF 635 CASES)

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THE sedimentation of the red blood cells has been the subject of considerable study in recent years. While there is much yet to be learned in regard to this phenomenon, the test of sedimentation rate has had a wide application and has been a valuable addition to the list of our laboratory procedures. In pulmonary tuberculosis especially the test has been recognized as a technical aid lacking heretofore in the management of this disease.

The cause of a change in the rate of the sedimentation of the red blood cells has never been satisfactorily explained, although several theories have been advanced, chief of which are: (1) the electrophysical theory—that it is due to some change in the electrical charge of the particles in suspension in the blood; (2) that it is controlled by the viscosity of the blood, auto-agglutination taking place under certain conditions; (3) that it depends on a change in the composition of the plasma proteins, the fibrinogen-globulin-albumin ratio. This theory appears to have the greatest following, although two investigators[1] in a recent article conclude, after careful blood analysis of a number of cases of rheumatoid arthritis in which the blood sedimentation is accelerated, that there is no parallelism between the fibrinogen, globulin or albumin percentage of the plasma proteins or ratios of these and the sedimentation rate. Whatever the cause, the test seems to be an indication of the degree of tissue breakdown going on in the body. Thus, an increased rate of sedimentation is likely to be found in acute or chronic inflammation and in malignancy. As far as known the only physiological condition in which an increased rate of sedimentation occurs is pregnancy, especially in the later months.

It should be pointed out at this juncture that a normal sedimentation reaction may be found in the presence of destructive but quiescent disease. As Cutler[2] puts it, "A normal sedimentation reaction indicates one of two things: either health or the existence of destructive disease not sufficiently active to disturb the natural stability of the blood; an increased sedimentation reaction is always abnormal, and, except in pregnancy, indicates the presence of disease." He also points out that, while the reaction is not of specific diagnostic value, it should be regarded as a diagnostic lead, demanding further investigation as to its cause.

Pulmonary tuberculosis is a chronic inflammatory disease with acute manifestations, in which at times there is much tissue breakdown. The sedimentation test in pulmonary tuberculosis therefore has come to be regarded as an index of the degree of tissue breakdown taking place, or the activity of the disease at the particular time under consideration. As an index of this sort it is reported to have an accuracy of 94 per cent[3] and to be a more reliable reflection of the real condition of the patient than that obtained by an assessment of other symptoms and signs of activity, such as fever, increased pulse rate, cough and sputum, sweats, anorexia, loss of weight, râles, etc.

The test has also been found to have considerable prognostic value in pulmonary tuberculosis. Trail,[4] in a study of 500 cases two to six years after discharge, concludes that the sedimentation test is a decided help, that the prognosis becomes increasingly grave with the higher rates of sedimentation, and that the patient's fitness for work ought to be founded as much on the movements of his sedimentation rate as on his pulse, temperature, "exercise tests" and sputum. The red cell sedimentation test, therefore, has been found to be of value, (1) as a diagnostic lead; (2) as an index of activity or the degree of tissue breakdown, especially in pulmonary tuberculosis, and, from this, a means of determining the progress of the patient; (3) in prognosis. The 635 cases in this series have been reviewed with these thoughts in mind.

* A paper read before the Laennec Society on October 25, 1935, at Gravenhurst.

The test was adopted in the Muskoka Hospital for Consumptives as a routine procedure in July, 1930, and since that time it has been carried out on all patients on admission, and at least every two months subsequently while in residence. The 635 patients of this study were the monthly admissions from July, 1930, to July, 1933. Our follow-up records have enabled us to keep in touch with the majority of these patients since discharge, and up to the last few months in many cases.

The method used is a modification of that advocated by Westergren.[5] It has been found to be simple, satisfactory and practical. The other methods in use are Linzenmeier's,[6] a determination of the time taken for the deposit to fall a set distance; and Cutler's,[7] in which the readings are taken every five minutes for one hour, and recorded graphically with the sedimentation in millimetres as ordinates and the time in minutes as abscissæ. Four lines or curves are emphasized: (1) the horizontal line found in clinically normal individuals; (2) the diagonal line found in clinically quiescent tuberculosis; (3) the diagonal curve found in clinically slightly active tuberculosis; (4) the vertical curve found in clinically markedly active tuberculosis.

Blood for our tests was taken as a rule between the hours of 9 and 10.30 a.m. Into a 2 c.c. sterile syringe is drawn 0.4 c.c. of a 3.8 per cent (isotonic) sterile solution of sodium citrate. This prevents the clotting of the blood, which is then taken from a superficial vein at the elbow and drawn up to the 2 c.c. mark. The mixture is ejected into a small bottle and thoroughly mixed by shaking or by the use of a pipette. Following this the mixture is drawn up to the zero mark in a 1 c.c. pipette which has a bore of 3 mm. and which is graduated in hundredths. The pipette is sealed with a small plug of soap by pressing the end of it into a cake of that material. Pipettes are conveniently arranged vertically in a rack. It has been found that readings are more accurate if the pipettes are always of the same bore and preferably of the same make. It is also of importance that the proportions of the blood-citrate mixture be consistent.

Readings of the degree or distance of fall of the sedimenting red cells are taken at the end of the first hour, at the end of the second hour and at the end of twenty-four hours, and are recorded as whole figures or numbers. The reading at the end of the second hour is really the important one in this method, and there is usually sufficient fall in this time to be readily measurable. Normal healthy individuals have been found to have readings at the end of the second hour of 10 or below. Some consider a reading of 15 or below normal for women. For the purpose of this paper readings of 15 or below have been taken as being normal in both sexes. The readings between 15 and 30 have been grouped as 15+; those 30 to 40 as 30+; those 40 to 50 as 40+, and those 50 and above as 50+. Few of the readings at the end of the second hour were above 60 and the highest reading recorded was 74. Incidentally, 80 per cent of the readings 15 or under were 10 or under. The percentages throughout this paper are approximate.

The total of 635 cases was classified on admission as follows:

Minimal cases	91	or	14	per	cent
Moderately advanced cases..	185	"	29	"	"
Advanced cases	286	"	45	"	"
Suspected cases	15	"	3	"	"
Non-pulmonary cases	7	"	1	"	"
Non-tuberculous cases	51	"	8	"	"
	635	"	100	"	"

It will be noted that almost half, 45 per cent, were advanced cases, while only 14 per cent were minimal.

Those cases diagnosed minimal, moderately advanced, or advanced pulmonary tuberculosis, if arranged in relation to their respective sedimentation rates on admission, result in the following Table, which in substance shows that in the great majority the sedimentation rate has been found to correspond directly with the extent of the active disease, that is, the more extensive or advanced the active disease, the faster the sedimentation.

SEDIMENTATION ON ADMISSION

	Normal		*15+*		*30+*		*40+*		*50+*	
Extent of disease on admission	*No. of cases*	*%*	*No. of cases*	*%*	*No. of cases*	*%*	*No. of cases*	*%*	*No. of cases*	*%*
Minimal.....	73	80	12	13	4	5	1	1	1	1
Mod. advanced	87	47	53	29	24	13	17	9	4	2
Advanced.....	36	13	66	23	75	26	49	17	60	21
Suspected cases	8	54	2	14	4	26	1	6	0	

Of the 15 suspected cases of pulmonary tuberculosis 54 per cent showed a normal sedimentation on admission. In these a definite diagnosis of pulmonary tuberculosis could not be made, but the symptoms and signs were suggestive.

All those above normal presented a condition of pleurisy with effusion, except one which had as a complication renal tuberculosis. On discharge, all were normal except two, one being the renal tuberculosis case. Subsequently a tuberculous kidney was removed from this patient. The post-operative sedimentation readings were not obtained. It is well known that pleurisy with effusion, especially recent, gives rise to an increased rate of sedimentation.

The 7 non-pulmonary cases were diagnosed on admission as follows: tuberculous peritonitis, tuberculous colitis (2), tuberculous adenitis, tuberculous epididymitis, tuberculous bladder (post-operative nephrectomy case), and chronic arthritis, possibly tuberculous. All showed a normal sedimentation on admission, except the case of tuberculous peritonitis, which was 24 at the end of the second hour, and normal on discharge.

Of the 51 non-tuberculous cases 70 per cent, or 35, had a normal sedimentation on admission; 22 per cent, or 11, were 15+; 8 per cent, or 4 cases, were 50+. The history of the 4 non-tuberculous cases with a sedimentation of 50+ is of interest. In one case the diagnosis was syphilis and the patient was put under treatment and discharged with a reading of 38, the specific treatment to be continued. The last follow-up record reported "Improved, working." Syphilis gives an increased rate of sedimentation. In passing, it might be said that 2.5 per cent in this series of 635 cases were found to have this disease as determined by the blood Wassermann test. The second case was diagnosed hypernephroma with metastases in the lung. This patient died three months after admission. The diagnosis was confirmed at autopsy. Malignant new growths give an increased rate of sedimentation, as much tissue destruction occurs in such cases. The third case was diagnosed lung abscess. Artificial pneumothorax was tried, the sedimentation dropped to 46, but acute empyema developed. This patient died four months after admission. The diagnosis in the fourth case was chronic empyema and bronchiectasis. This patient underwent thoracoplasty three months after admission, has now been in residence two years, and is improving. The sedimentation rate dropped to 38 after thoracoplasty.

Considerable study has been done to determine the effect that anæmia has on the rate of sedimentation. Some observations have been made in this series of the relation of the hæmoglobin percentage to the sedimentation rate. Sixty-four cases, of which 50 were classified as advanced, of the total of 635 were found to have hæmoglobin percentages under 70.

SEDIMENTATION ON ADMISSION

	Normal	*15+*	*30+*	*40+*	*50+*
Cases with hæmoglobin under 70% on admission	7 11%	11 17%	7 11%	13 20%	26 41%
Hæmoglobin range	48 to 68	40 to 68	35 to 68	38 to 68	40 to 68 1 Case—Hb. 22%

On tabulation of these, it was found that the hæmoglobin percentage varied from 35 to 68, and the sedimentation readings from normal to 50+, 11 per cent being normal. There is apparently no constant relationship between the two. A hæmoglobin percentage of 22 occurred in a patient with advanced pulmonary tuberculosis complicated by hypochromic anæmia. The sedimentation reading in this case was 74, the highest of any recorded in this series of 635 patients. Death occurred seven months after admission, being preceded by a drop in the sedimentation to 65. It would seem, therefore, that unless the anæmia is severe it does not affect the test to any significant degree. This has been the experience of others[8, 9] as well. This assertion was borne out also in the case of an out-patient, a non-tuberculous case, who was treated for severe secondary anæmia, brought about by bouts of rectal bleeding from hæmorrhoids at fairly frequent intervals over a period of about one year. When first seen, his hæmoglobin was 40 per cent, red cell count 3,650,000, and yet the sedimentation reading was only 6 at the end of the second hour.

The effect that artificial pneumothorax has on the rate of sedimentation is readily observed. In those cases in which the collapse is satisfactory a decided decrease in the rate soon becomes evident, but in those in which it is only partially

satisfactory the decrease is not so dramatic. By a satisfactory collapse is meant one in which the diseased area is put at rest and the collapse may be technically total or subtotal; a partially satisfactory collapse is one in which only a portion of the diseased area has been affected.

Taking the sedimentation test as an index of activity, a comparison has been made, over a period of three years, of the effect of artificial pneumothorax as compared with routine treatment in bringing about quiescence. The tabulation shows that of those cases of advanced disease with sedimentation rates from 30 to 60, and in which only routine treatment was used, 35 per cent had normal sedimentation rates on discharge. On the other hand, in those in which artificial pneumothorax was employed the rate became normal in 73 per cent. Apparently the satisfactory pneumothorax is twice as effective in bringing about a cessation of activity as routine treatment.

SEDIMENTATION

	30 - 60 on admission	*Normal on discharge*	
Advanced cases on routine treatment	26	9	35%
Advanced cases on artificial pneumothorax	26	19	73%

During the course of treatment by artificial pneumothorax the sedimentation test taken at regular intervals is valuable as an indication of the effectiveness of the therapy, and also as an indication of the activity of any lesion on the opposite side. One may feel justifiable assurance that everything is going well if the sedimentation continues to drop during the course of treatment, otherwise trouble should be looked for.

Of the total of 635 patients, 96, or 15 per cent, died in residence. Two of these had minimal disease on admission. One had a sedimentation rate of 40+ and complications were present in the form of severe tuberculous adenitis and peritonitis; the other had a sedimentation rate of 15+ and the disease was progressive, complicated by tuberculous meningitis in the late stages. Nine were moderately advanced. Two were non-tuberculous cases. Eighty-three, or 86 per cent of those who died, had advanced disease on admission, and at that time only 2 per cent showed normal sedimentation rates, whereas 88 per cent were over 30, including 42 per cent which were 50+. The tabulation is shown below.

SEDIMENTATION ON ADMISSION OF THOSE WHO SUBSEQUENTLY DIED IN RESIDENCE

Extent of disease on admission	*Normal*	*15+*	*30+*	*40+*	*50+*
Minimal	0	1	0	1	0
Moderately advanced	1	3	2	2	1
Advanced	2 2%	8 10%	24 29%	14 17%	35 42%
Non-tuberculous	0	0	0	0	2

A study of the mortality rate in 218 cases of advanced disease with normal or abnormal sedimentation rates gives an interesting comparison.

SEDIMENTATION ON ADMISSION

Advanced Cases	*Normal*	*15+*	*30+*	*40+*	*50+*
Living up to time of discharge.	23 92%	37 80%	38 62%	21 58%	16 32%
Died in residence	2 8%	9 20%	23 38%	15 42%	34 68%

The tabulation shows that of those with a normal sedimentation rate on admission, 92 per cent were living up to the time of discharge, and 8 per cent had died in residence. In comparison, of those, at the other extreme, with a rate of 50+ on admission, 32 per cent were living and 68 per cent had died.

That the sedimentation test can be depended upon as an aid to prognosis is further borne out by a consideration of the condition of patients one to five years after leaving the hospital, in relation to the sedimentation reading on discharge.

SEDIMENTATION ON DISCHARGE

Condition 1 to 5 years after discharge	*Normal*	*15+*	*30+*	*40+*	*50+*
Improved	194 89%	34 72%	6 30%	2 22%	0
Unimproved	20 9%	10 21%	9 45%	2 22%	2 40%
Died	4 2%	3 7%	5 25%	5 56%	3 60%

It was found that of those with a normal sedimentation rate on discharge 89 per cent reported improvement; some were working; 9 per cent were unimproved; and 2 per cent had died. Of

those with a sedimentation reading of 50+ on discharge, none reported improvement; 40 per cent reported no improvement; and 60 per cent died. Siltzbach,[10] using the Cutler method, found that 97 per cent of those patients showing a normal horizontal-line curve at the time of discharge remained well during the subsequent year, whereas 46 per cent of those patients discharged with a vertical curve died in this same period. It is evident that a patient can be discharged with increased assurance if, along with favourable clinical and radiological findings, he presents a normal sedimentation rate.

SUMMARY AND CONCLUSIONS

The rate of sedimentation of the red blood cells in pulmonary tuberculosis is a reliable indication of the activity of the disease, and, to some degree, of its extent.

It may also indicate the presence of some other organic disease or complication which should demand further investigation.

It is a useful and reliable gauge of the effect of collapse therapy.

A persistently rapid sedimentation rate should be considered of grave significance.

The test is of definite value in estimating a patient's fitness for discharge and in determining prognosis.

I wish to express my thanks to Dr. C. B. Ross for reviewing this paper and for his helpful and valuable criticism.

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THE PHYSICIAN AND MODERN DIETETICS*

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FEEDING of the sick has undergone marked advances during the past decades. Not long ago diet for the well and ailing was nothing but a procedure governed by rule of thumb, aided by empiricism. Many were the heritages, inaccuracies, and legendary dietetic processes at our disposal at that time. As our investigations progressed, these old stand-bys began to prove worthless, and in some instances what had been considered of specific therapeutic value was found to be actually deleterious. In 1840 it first became recognized that foods possessed nutritive elements. Probably the first major source of aid in this country was the tabulation of these elements in common foods. This was first presented in 1895 in the epochal work of Atwater and Woods, who were responsible for the material contained in the famous Bulletin 28 of the Department of Agriculture of the United States of America. This work has served as the backbone of the analyses of American foods. From a more popular medical viewpoint, E. A. Locke, of Boston, rendered this material readily available in a modified form to the practitioner, nutritionist and food-conscious patient through his "Food Values", published in 1911.

Lately we have been offered chemical analyses of the same foods. Coincident with this work, information relative to the action of the physical body upon the various foodstuffs and minerals was supplied. Promptly thereafter biochemistry became of clinical importance. For the first time it was possible to determine what was occurring in the body as the result of diet in health and disease. Folin, Myers, Benedict, Van Slyke and others have afforded us most important data with reference to the body's reactions to foods. More elaborate chemical aids have been constantly introduced, with the result that empiricism is being rapidly replaced by scientific knowledge. More recent-

* Read before the Lincoln County Medical Association, St. Catharines, Ont., on December 2, 1935.

ly, the names of Sherman, Eddy and Rose have been intimately associated with the presentation of the scientific data produced by themselves and others. To them are due much credit for the dissemination of accurate information concerning the mineral and caloric values of food products. With due respect to the nationally recognized personages in the field of nutrition, and in spite of their honesty and accuracy, much misapplication of their work has been foisted knowingly and unknowingly, and, it might even be said, with dishonest intent, on the medical public. The result is that many deviations from the original presentations of these workers have been the result of guesses, approximations and unwarranted deductions on the part of self-styled nutritionists.

Today the dietetic management of patients is far too complicated for the physician of several decades ago. It demands a knowledge of physiology, pathology, chemistry, nutrition and psychology, among other prerequisites. No longer can the self-educated nurse-cook be entrusted with the planning of a diet. No longer can gross-hand weighing be utilized in the establishment of diet quantities. The time has arrived when dietetics has become a science wherein the likelihood of error on the part of the nutritionist should be at a minimum, and the only chance of error in the proper application of a dietetic regimen should rest on a faulty diagnosis. The physician, as a rule, is completely unskilled in dietetics. His preliminary training encompasses little or nothing concerning food prescription. At most, he is familiar in a general way with some diet for duodenal ulcer, diabetes or typhoid fever, but very promptly this original knowledge is dissipated and he is forced to depend upon the hospital dietitian. Through the efforts of students of nutrition the physician is realizing that the science of nutrition should be a fundamental asset in the care of the patient.

To properly approach the prescription of a satisfactory diet it is essential that a number of phases be taken into consideration in reference to the individual for whom items of food are to be regulated. A carefully taken dietetic history extending over the previous months should be immediately instituted. An analysis of the patient's habits, idiosyncrasies, likes and dislikes, together with a volumetric and caloric estimation of several average daily menus, should be included. Casual estimation of the nutritive as well as the non-nutritive factors of such a menu should be ascertained, which means that the carbohydrate, fat, protein, alcohol and water intake per diem, as observed in the past, should be established. Further refinement may be done by grossly estimating the quantity of the various minerals, but this appears to be a questionably advantageous factor, particularly as our knowledge of minerals is exceedingly meagre.

It is important in the analysis of the patient's immediate complaint to determine whether the clinical picture, as presented at the time of the complaint, is a true product of a diseased entity itself, or only indirectly due to this disease. For example, has the patient partaken of sufficient food yielding enough calories to maintain the established body weight, or has the complaint, which might be pains in the stomach, produced an anorexia wherein this caloric intake has been markedly reduced? It is not uncommon to find the sufferer presenting a picture of starvation rather than of organic incapacity to assimilate sufficient calories.

Complete chemical blood analyses are of value not only in establishing the present status of the body as regards food elements but also in supplying information relative to any metabolic defect. Most of the blood substances are subject to marked alteration due to the over- or under-ingestion of various foods. Prior to planning a diet, it can readily be seen that the past dietetic history, combined with chemical blood analyses, must establish certain dietetic demands aside from any presenting pathological condition.

The real work of the nutritionist commences only after the establishment of a specific diagnosis. At this juncture it is essential to review the new dietetic demands which are made in the face of a disturbed physiological state. For example, if the patient is suffering from a duodenal ulcer, and the indicated diet is to be low in acid as well as low in those foods highest in roughage, it is important for the prescriber to take into account the total physiological picture, aside from the specific diagnosis. Such factors as overweight, anæmia, and idiosyncrasies should be considered when the dietetic compilation is made. If a patient for some

reason or other has never been able to take eggs, it is far from good practise (unless the indication is imperative) to force this offending food. Like recognition should be observed in similar instances when the intolerance has been substantiated as being real and not fancied.

Dietetic incompatibilities often arise. Instances are experienced in the management of spastic colitis and chronic cholecystitis, two conditions which are commonly co-existent. The patient suffering with this combination often exhibits a definite fat intolerance which generally makes the institution of a colitis diet of relatively high-fat content impractical. The present-day accepted diet for spastic colitis is one in which roughage is avoided and in which fat is generally high, whereas the generally recognized diet for gallbladder disease is the antithesis thereof. This should be investigated and a practical readjustment should be instituted. In dealing with an overweight patient suffering from colitis it behooves the practitioner to compute a diet of lower caloric value than that routinely prescribed for this condition. In other words, wherever possible, the principle of feeding the patient and not solely the disease should be practised.

The physician is likely to fall into error from misunderstanding or improper application of the armamentarium with which he has been supplied. This is especially true in the establishment of specific diets, the specificity of which may call for a set amount of protein, fat, carbohydrate or some of the mineral substances. For example, lentils are rated as one of the highest iron-bearing food substances available. There can be no question concerning the authenticity of the analysis of the lentil, but, unfortunately, this analysis was done on dried lentil, which is not edible as such. In the course of its preparation as a palatable food the iron content becomes so diminished that it is impractical to consider it as a real iron-bearing factor. In the dried state the carbohydrate content of macaroni, spaghetti, and noodles is exceedingly high, but after these foods are boiled, owing to dilution by water, the carbohydrate value is markedly diminished and exceedingly variable. Another example of a likely misadoption of analytical data may be found in the case of parsley, which has been proved to be an excellent source of vitamin A and vitamin C. It is very likely that with this information, the practitioner will probably recommend parsley as a valuable vitamin A and C food. When one considers the relatively infinitesimal amount of parsley that a patient usually takes, it can be readily seen that its prescription is little short of ridiculous. Still another illustration of a likely misapplication of analyses concerns cocoa, with particular reference to its copper value. The copper content of cocoa is listed as being next to the highest in all edible foods. Therefore when a food of high copper concentration is desired the recommendation of this item would apparently be indicated. However, when it is realized that the high copper percentage of cocoa was established from the analysis of the dry substance, and when one considers the small amount of cocoa used when it is served as a beverage or used as flavouring, it is evident that the actual amount of copper obtained is negligible.

Errors are likely to enter when it becomes necessary to augment a diet by additional protein. It is well known that gelatin, fish, cheese, white of egg, poultry and meat are the chief sources from which protein is obtained. Gelatin, if the analyses are correct, contains from 90 to 95 per cent of protein. However true this statement may be, it can be seen readily that the giving of crude gelatin as a food is impractical. Therefore, it is generally given in solution which has to be so dilute for palatability as to render the protein content of little value.

The present status of food analyses leaves much to be desired. Very little work has been done since the publishing of Bulletin 28, previously referred to, in the way of furnishing additional analyses of percentage compositions of carbohydrates, fats and proteins of the common foods. A review of the various food analytical tables available at the present writing reveals nothing but an alteration or readaptation of the material contained in that bulletin, with the result that the inaccuracies and alterations have been so extreme as to render the source unrecognizable.

Strangely, the majority of food analyses determined to date have been on the raw product, with the result that figures are absent for the most commonplace foods in the edible cooked state. Naturally, this insufficiency of data

renders accurate dietetic computation impossible. Strange to relate, this discrepancy is commonly overlooked, with the result that patients are charged calorically with values derived only from the analyses of raw food items. This insufficiency of data is most evident in the instances of meat and fish. The mineral analyses have shown more promise, and a wealth of material, much of which is inaccurate, has been produced from a great number of sources. At present, we need further investigation of the nutritional and mineral analyses of cooked foods.

During the past several decades the public has come to use canned and packaged foods. From the dietetic standpoint, strange as it may seem, little recognition has been taken of these products, and the analyses of the same have heretofore been unavailable to the practitioner without correspondence with the manufacturer. Hence, it behooves us to have readily available the analyses of these products in conjunction with the analyses of common foods. The use of commercial foods has so far infiltrated into the daily menu of the public that to preserve the old attitude of insisting upon fresh and non-commercial products is archaic. With due respect to commercialism and the honest intent of the majority of food manufacturers, the percentage of dishonest propaganda is too alarmingly apparent. An unscrupulous minority preys upon the vanities and current fads of the population as a whole, with their force mainly directed at the female sex.

Much propaganda is being issued in reference to vitamins. Commercial interests are even sponsoring foods synthetically impregnated therewith. If we were to believe the literature with which we are deluged our mental equilibrium would be in a constant state of turmoil. Failure to take this or that vitamin as advised by the commercial interests would appear to make us guilty of self-destruction.

Vitamin A, a normal constituent of many fats, exhibits its deficiency by xerophthalmia, night-blindness, questionable calculus formation in man, and retardation of growth and development in young animals. Deficiency of vitamins B, B_1 or F, found among the meats, particularly pork, as well as oysters and other seafood, produces an anorexia, neuritis, amenorrhœa in the female, and several other indeterminate symptoms. There should be little danger of marked vitamin B deficiency, except when the diet is limited solely to artificially refined foods. Vitamin C, contained in the citrus fruits, parsley, red and green peppers, new cabbage, and tomato juice, exhibits its deficiency in the historical disease, scurvy. Vitamin B_2 or G, normally found in milk and milk products, when deficient, appears to be associated with dermatitis and alopecia. Vitamin D, a normal constituent of a large number of sea-foods, butter, cream and egg-yolk, when deficient, seems to affect bone metabolism, either directly or through some undetermined effect upon calcium metabolism. Vitamin E, plentiful in leafy vegetables, legumes, wheat germ and meat, serves an indeterminate function, but its deficiency appears to be definitely associated with ovulation and sterility. Needless to say, in spite of all the fore-going, it has been universally proved that any well-balanced diet contains adequate vitamins of all types to forestall any diseases traceable to vitamin deficiency. The same attitude may be assumed with safety in reference to minerals.

Another confusing piece of propaganda has been built around the term "acidosis". This unoffending word has given birth to myriads of definitions. Anything from acid mouth to acidity of the urine has at one time or another been called "acidosis". In combating this apparently dread disease, which, incidentally, is nothing but a symptom, foods have been maliciously mis-classed and incorrectly prescribed. Were we to believe both the moderately remote and most recent advertising propaganda anent alkalinization and alkaline waters, our acid stomachs, acid bloods, acid urines, and acidoses would be a matter of most trivial significance. The unfortunate objection to these products on the part of the medical profession is that none of them contain sufficient of the reported elements to be of any practical therapeutic value without the human being imitating the well-known camel.

Still another much-abused term is "protein". It had become a fetish among the public, and, incidentally, among many of the profession, empirically to prescribe a low protein diet for the person beyond middle life. It seemed well understood and agreed that red meats, eggs, cheese, poultry and fish were not well tolerated

by the elderly. As a result, the physician finds in his practice today, a large number of patients in later life who are suffering from nutritional anæmia because of the adherence to this heritage. In these cases it is the rule to find a subnormal blood urea nitrogen which is pathognomonic of protein deprivation. As a matter of fact, recent investigations have revealed that the daily protein intake of the average individual is only 45 to 50 grams. Consequently, in view of the fact that the current recommended requirement per diem is 75 grams per 150 pounds to replace the daily protein waste, it must be evident that the actual facts do not confirm the statement that the average person eats too much protein.

Further propaganda extols the claims of diets predominating in vegetables. In these instances it is assumed that the normal protein requirement is supplied, in the main, by vegetables and nuts. Obviously, to obtain the requisite amount of protein from these items makes it necessary for the total vegetable and nut ingestion to be beyond the average volumetric capacity of a normal person. Vegetarianism, in spite of its wide-spread acclamation and devoted followers, presents an inexplicable inconsistency. Its principles forbid meat protein, but they incorporate most lavishly, milk, eggs and cheese, all animal products as much as the flesh of the animal.

Much interest is being shown by the laity and some of the profession in a so-called protein-starch regimen. We are constantly hearing that starches and proteins should not be taken at the same meal. It is asserted that the two items are incompatible when ingested at the same time. The principle of this diet is physiologically unsound and may be capable of doing actual harm to those who follow it. This unphysiological proposal is most aptly controverted by the very preachings of its chief endorser. Milk and vegetables are allowed at the same or different times. It takes but the simplest mind, medical or otherwise, to promptly realize that the starch and protein components in these two items of food are inseparable.

As a result of the advances in the several fields of nutrition many of the empiricisms of the past have been refuted. The great strength-giving qualities of broth have been proved to be a myth. Red meat, in contradistinction to well-done meat, has likewise been found to be a differentiation without a nutritional difference. The white meat of chicken as a food for the invalid, aside from its possible pleasing appearance, has acquired a successful competitor in the dark meat from the same fowl.

We have been incessantly "ballyhooed" by the claims of this or that type of coffee. We are constantly being confused by the health-giving or detrimental features contained in stale, fresh, or decaffeinated coffees, or coffee substitutes. The advertising propaganda in reference to these products seems to be directed essentially at that terrible offending alkaloid —caffeine. Little cognizance is taken of the other elements contained in coffee, whether stale, fresh or decaffeinated. From the gastroenterological viewpoint it is not felt that caffeine is the major factor in the production of detrimental effects from the use of coffee, but that the other elements contained in the coffee beverage are the culprits.

Even common table salt has been accorded prominence by the production of numerous salt substitutes, the majority of which still contain the harmful sodium radical in combination with some radical, other than chlorine.

Many ambitious self-styled investigators, looking for a place in the sun, are constantly formulating weird, impractical and often harmful catch-title regimens. In rebuttal to any newly proposed diet, the application of an attempted hypothesis herewith presented, should be applied:

The proper attitude to assume in reference to any newly-developed diet is to check its principles against sound, known physiological demands. When these are met by any new regimen, and when such things as palatability and avoidance of monotony are accomplished, together with successful demonstration of clinical response under competent observation, then such a dietary is worthy of commendation and institution.

OBSERVATION ON THE USE OF IRON PREPARATIONS IN THE TREATMENT OF ANÆMIA

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THE treatment of the hypochromic anæmias with various iron salts has in recent years received much attention and the preparations of iron salts offered on the market are many and varied.

Starkenstein and Weden[1] suggest that the potency of an iron preparation depends upon the liberation of ferric ions following the action of gastric and intestinal secretions, hence the most ideal iron salts should be the sulphate, carbonate or chloride. The percentage of ferrous ions liberated from an iron salt must be considered when the various preparations are used. Iron and ammonium citrate is very low in this respect, while ferrous sulphate and ferric chloride are ideal. Heath[2] has found that iron and ammonium citrate and ferrous carbonate offer the same low percentage of iron utilization. He also states that Pil. Ferri in 15 grain doses gives a higher percentage utilization of iron than do the optimal doses of 45 grains, suggesting that the smaller doses are more readily absorbed. The apparent differences which exist between the optimal doses of the various iron preparations possibly depend on the degree of solubility, ionization and absorption of the preparation.

This report contains in brief the results obtained with the use of four well known iron preparations in cases of hypochromic anæmia. Forty patients were treated. The primary disease present in the series varied, some being cases of carcinoma, others nutritional anæmias, anæmias of pregnancy, and anæmias due to blood loss of small amount over a long period of time. An attempt was made to group the cases so that at least one case of each type fell into one of the four groups.

The forms of iron used were as follows.

1. *Ferrous sulphate.*—This drug was used in tablet form, each tablet containing 3½ grains of ferrous sulphate and 3½ grains of concentrated vitamin B_1 and B_2. The dosage was 2 tablets 3 times daily after food. The results were very encouraging, and while the end-results were no more outstanding than with the other iron preparations, certain points were of note, to wit: (1) the response to treatment was apparent somewhat earlier than with the other preparations; (2) there was no complaint of gastric upset; (3) constipation and diarrhœa were absent, and there was no complaint of abdominal cramps.

2. *Reduced iron.*—This drug was given in massive doses of 45 grains daily. Smaller dosage was inadequate. Under massive dosage the patients complained, with great enough frequency to warrant consideration, of either constipation, diarrhœa, or gastric upset.

3. *Iron and ammonium citrate.*—The results with this drug were comparable to those with reduced iron. For the first two days during which the drug was given, 40 grains a day was the dosage, and if well tolerated this was increased to 90 grains daily. The patients who responded to this drug did so very rapidly but there were several cases in which no response was obtained. Further objections to this form of iron were gastric upset and staining of the teeth.

4. *Blaud's pill.*—Fresh supplies of the preparation were used. It was found that a dosage of 45 grains per day was the optimal dose. Smaller dosage failed to give a good response. The main objection to this preparation was on the part of the patients, and they complained of the large bulk of the tablet.

The results in tabular form, as shown on page 665, were of interest.

SUMMARY

In considering ferrous sulphate, reduced iron, iron and ammonium citrate, and Blaud's pill, as to their respective merits in the treatment of anæmia, it would appear that each appears of equal efficiency if given in adequate doses.

TABLE

FERROUS SULPHATE WITH VITAMIN B_1 AND B_2

Case	Diagnosis	Daily dosage	R.B.C. & Hgb. at start	R.B.C. & Hgb. 1 week	R.B.C. & Hgb. 2 weeks	R.B.C. & Hgb. 3 weeks
		grains				
1	Malignancy	21	4,730,000—71%	4,870,000—78%	4,970,000—85%	5,000,000—90%
2	"	14	4,000,000—65%	4,100,000—66%	4,770,000—78%	4,900,000—90%
3	"	21	4,550,000—74%	4,270,000—65%	3,570,000—63%	3,250,000—55%
4	Anæmia of pregnancy	21	4,200,000—70%	4,180,000—81%	4,500,000—85%	5,000,000—92%
5	Nutritional anæmia	21	4,320,000—80%	4,860,000—75%	4,980,000—85%	4,990,000—85%
6	Malignancy	21	4,110,000—55%	4,500,000—65%	4,800,000—70%	4,950,000—80%
7	Nutritional anæmia	21	3,900,000—50%	4,770,000—65%	4,900,000—70%	5,420,000—98%
8	" "	14	4,000,000—54%	4,000,000—80%	4,800,000—80%	4,850,000—88%
9	Malignancy	14	3,620,000—50%	3,900,000—70%	3,500,000—50%	4,000,000—69%
10	Hæmorrhoids	21	3,800,000—55%	4,500,000—75%	4,950,000—80%	5,100,000—85%
	REDUCED IRON					
1	Anæmia of pregnancy	45	3,420,000—60%	4,000,000—65%	4,350,000—70%	5,100,000—82%
2	Nutritional anæmia	45	3,400,000—62%	4,000,000—70%	4,500,000—80%	5,000,000—88%
3	" "	45	4,000,000—70%	4,200,000—72%	4,800,000—84%	5,150,000—92%
4	Anæmia of pregnancy	30	3,950,000—65%	4,100,000—70%	4,250,000—75%	4,400,000—78%
5	Malignancy	45	3,800,000—68%	3,950,000—70%	3,950,000—70%	3,450,000—68%
6	"	30	4,200,000—71%	4,000,000—73%	3,850,000—70%	3,660,000—65%
7	"	45	4,000,000—70%	4,050,000—72%	4,000,000—70%	4,100,000—75%
8	Hæmorrhoids	45	4,150,000—70%	4,400,000—80%	5,000,000—85%	5,000,000—90%
	IRON AND AMMONIUM CITRATE					
1	Malignancy	90	3,420,000—70%	3,900,000—74%	4,230,000—82%	4,800,000—86%
2	"	40	3,200,000—43%	3,160,000—39%	3,800,000—50%	4,350,000—65%
3	Hæmorrhoids	90	3,700,000—50%	4,000,000—58%	4,200,000—60%	4,500,000—72%
4	Anæmia of pregnancy	90	3,500,000—50%	4,100,000—65%	4,500,000—75%	5,000,000—90%
5	" "	90	4,000,000—68%	4,250,000—70%	4,400,000—74%	4,800,000—80%
6	Nutritional anæmia	40	4,100,000—65%	4,325,000—70%	4,325,000—70%	4,400,000—72%
7	Chlorosis	90	3,600,000—52%	4,000,000—62%	4,400,000—70%	4,900,000—80%
8	Post partum hæmorrhage	90	3,250,000—45%	4,100,000—65%	4,800,000—76%	4,950,000—84%
9	Malignancy	90	3,950,000—58%	3,500,000—54%	3,400,000—54%	3,000,000—40%
10	Nutritional anæmia	90	4,100,000—62%	4,500,000—70%	4,800,000—78%	5,000,000—85%
	BLAUD'S PILL					
1	Malignancy	45	3,850,000—65%	3,900,000—65%	4,000,000—70%	4,000,000—70%
2	"	30	3,900,000—68%	3,800,000—60%	3,450,000—58%	3,450,000—55%
3	Nutritional anæmia	45	3,840,000—68%	4,000,000—72%	4,250,000—74%	4,900,000—80%
4	" "	30	4,000,000—78%	4,500,000—82%	4,700,000—85%	5,000,000—90%
5	" "	30	4,150,000—80%	4,100,000—80%	4,200,000—80%	4,000,000—80%
6	Hæmorrhoids	45	4,000,000—76%	4,500,000—80%	5,000,000—86%	5,100,000—90%
7	Anæmia of pregnancy	45	3,950,000—75%	4,000,000—80%	4,650,000—85%	5,200,000—95%
8	Hæmorrhoids	30	3,850,000—65%	4,000,000—70%	4,100,000—70%	4,350,000—74%
9	Malignancy	45	4,000,000—70%	4,400,000—76%	4,500,000—75%	4,800,000—80%
10	Hæmorrhoids	45	4,125,000—72%	4,600,000—78%	5,000,000—85%	5,000,000—90%

Ferrous sulphate with concentrated vitamin B_1 and B_2 possibly excites an earlier response. Fullerton[3] has very truly stated that the question resolves itself into one of cost and convenience. Blaud's pill hardens on keeping and is bulky. Iron and ammonium citrate is only fairly well tolerated and stains the teeth. Reduced iron is a "messy" preparation. Ferrous sulphate is less bulky and can be taken in smaller doses and is a very inexpensive form of iron therapy.

Grateful acknowledgment is made to the Petrolagar Laboratories of Canada, who supplied the necessary ferrous sulphate for the above work, under the trade name of "Plastules (Deshell) Plain", and to the Burroughs and Wellcome Company for liberal supplies of reduced iron and Blaud pill.

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THE RELATION OF BRONCHIECTASIS TO PARANASAL SINUS INFECTION*

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DURING the past fifteen years widespread interest in the relationship of bronchiectasis to paranasal sinus infection has been shown by the numerous articles which have appeared in medical literature, especially in those journals devoted to otolaryngology. This interest has been increased by the stimulating advances made in the fields of bronchoscopy, roentgenology and chest surgery and particularly by our increased knowledge of the reaction of the mucous membranes of the respiratory tract to allergy and to infection. Our knowledge, however, of some of the phases of this relationship is still obscure. A brief résumé of the literature will help to summarize our present views on this subject.

VIEWS ON CAUSAL RELATIONSHIP

As early as 1914 Thomson suggested that a persistent bronchorrhœa might be due to chronic sinus suppuration. Later Sergent, Rist, Webb and others, noting the presence of sinusitis in patients with pulmonary suppuration, stressed the importance of a thorough examination of all the sinuses in these patients. Mullin found that in almost all his patients with bronchiectasis a co-existing sinusitis occurred. He believed that a primary bronchitis tended to clear up unless it was kept active by a well marked sinus infection.

Peroni, after an extensive investigation of the sinuses in bronchiectasis, concludes that coexisting sinusitis is very often primary. When not so, he believes that the nasal condition is sufficient to augment and protract the disease.

Wasson suggests the term broncho-sinusitis for those infections involving the entire respiratory tract—especially those of a chronic nature. He followed 90 children from birth to eight years of age and believes that, while there is no common etiology, this condition is greatly influenced by lack of vitamines, by heredity, environment, climate and air contamination.

Opie, in a study of the pathological anatomy of influenza from British and American sources, states that infection of the nasal accessory sinuses appears to be an almost invariable accompaniment of influenzal pneumonia. It is interesting to note also that bronchiectasis has been frequently found as a sequela of influenza. Clerf suggests that bronchiectasis, when associated with sinus infection, is usually bilateral. Adam, on the contrary, believes unilateral bronchiectasis occurs with sinusitis.

An interesting observation has been made by Graham. He noted the frequent occurrence of an acute inflammation of the mucous membranes of bronchial fistulas which took place about twenty-four hours after the onset of an acute sinus infection. With the improvement of the upper respiratory infection he observed that the reaction in the bronchial tissues also cleared up.

FREQUENCY OF RELATIONSHIP

Statistics from various centres have shown the relationship of chronic sinusitis and nontuberculous bronchiectasis to be extremely common. It has been said to vary from 55 to 100 per cent; Clerf reported 82.4 per cent, Dunham and Skavlem 73 per cent, Quinn and Meyer 58 per cent. In a series of 37 patients at the Montreal General Hospital with bronchiectasis, we found that approximately 75 per cent showed an associated sinusitis. Like the great majority of other authors we found the maxillary sinus most frequently affected.

Just what the frequency of this relationship indicated is still a subject for discussion. Numerous authors insist that sinusitis is the primary cause of bronchiectasis; others suggest the bronchiectasis as primary. The latter has not, however, been proved. In an effort to check this possibility in some ten patients with bronchiectasis, at the General Hospital, I placed

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a small amount of lipiodol in the trachea. The patients were postured and asked to cough. In only three patients were traces of lipiodol found by x-ray in the naso-pharynx. Argyrol was also used in a similar number of patients. A few only showed any stain in the naso-pharynx. No lipiodol or argyrol was found in the nose. When coughing, the soft palate seemed a fairly efficient barrier to the entrance of these substances into the naso-pharynx. The majority of writers on this subject believe that the whole respiratory tract is simultaneously affected and that, although the bronchitis and pneumonitis tend to clear up, they are kept active by the constant overflow from infected sinuses.

The various routes by which nasal sinus infection may influence the respiratory tract have been frequently referred to. Davis described the following: (1) by direct extension of the inflammation of the larynx, trachea, and bronchi, or by extension of the infection through the blood and lymphatic streams; (2) by aggravating or increasing an existing lesion of the lungs; (3) the nasal sepsis may be part of the general infection in which both the upper and lower respiratory tracts are involved.

Much has been done experimentally to show the relationship of sinusitis and non-tuberculous bronchiectasis. The work of Mullin and Ryder has been frequently cited. They demonstrated the lymphatic drainage of the maxillary sinuses and their connection with the lungs, and also the inhalation route by which nasal secretions reach the lungs. The work of Pfhaler, of Philadelphia, and Le Mee, of Paris, with lipiodol seems to have completely corroborated these earlier experiments. Quinn and Meyer demonstrated lipiodol in the thorax after injecting it into the nostrils of sleeping patients. And McLaurin showed that, after placing lipiodol in the antrum, it could be demonstrated in the chest by x-ray.

These experiments clearly demonstrate that chronic sinusitis must play a very important part in chest infections, and that infection reaches the thorax chiefly by the inhalation and lymphatic routes.

Some criticism of this latter route has been recently shown and there now seems to be a general belief amongst writers that the etiological influence of the sinuses in focal infection has been over-emphasized. Childrey and Essex have indeed described the sinus mucous membrane as being highly resistant to absorption. Lawson, however, believed that toxæmia, in chronic disease of the sinus membrane, is of great clinical significance and probably originated from absorption of small quantities of highly virulent toxins generated within the sinus cavity. Kistner and Jones have demonstrated streptococci of virulent types from the submucosa of numerous cases of coronary disease. Hurd and Synder believe that sinusitis without evidence of discharge is responsible for many cases of serious arthritis. In a recent interesting article, it has been shown by Tilly that there is frequently a residual infection in the bone tissues of the sinus capsule and that this is one of the most potent foci for the vascular transmissions of septic organisms and their toxins. It is therefore very probable that in this type of case and in the so-called silent cases of sinusitis with little drainage absorption from the sinuses to the lungs is most marked.

The frequent absence of all symptoms of sinus disease when associated with bronchiectasis has been frequently noted, but I do not believe has yet been sufficiently emphasized. Frequently nasal disease, when unaccompanied by pain, is not complained of by the patient, and only a thorough examination will detect the sinus infection. Mullin, in reporting 295 patients, stated that in nearly 7 per cent of these patients cough was the only symptom, although well marked sinus infection was present in all. Frequently also, cases have been reported which have been treated for tuberculosis over a period of years and which have been in reality suffering from sinusitis and bronchiectasis.

What is perhaps a common experience amongst laryngologists has been emphasized by Clerf. Patients complaining only of a chronic cough and husky voice are found, upon laryngeal examination, to have a chronic laryngotracheitis. A thorough physical examination of these patients fails to show any evidence of thoracic disease. Yet an examination of the sinuses and nose reveals a chronic sinusitis. A routine examination of the sinuses then should be made in all patients with infection of the lower respiratory tract. This procedure would

reveal, as many authors have indicated, many unsuspected cases with sinus involvement.

The assumption then is, that, following the sinusitis, a chronic bronchitis develops and, in the course of time—perhaps years, a bronchiectasis. The process by which this occurs is not completely understood and there seem to be many exceptions. Frequently a patient with sinus involvement, even a pansinusitis, with a history of post-nasal discharge and cough for years, is found to have little or no evidence of thoracic disease. Why then does the lung seem so resistant to infection in some patients and succumb so easily in others? The resistance of the individual and the virulence of the organism must of course be taken into consideration. Why also, if this assumption is correct, do chronic sinusitis and bronchiectasis occur in very young children in whom the duration is obviously short. All recent evidence would seem definitely to suggest that some change occurs in childhood which predisposes these patients to subsequent lung infections.

THE INFLUENCE OF ATELECTASIS IN BRONCHIECTASIS

Bronchiectasis has been well described as a disease of childhood. And it is interesting to note, in reported histories, the frequency with which patients with bronchiectasis date their symptoms to early childhood. In recent years authors have described, in children, a triangular shadow at the base of the lung in pulmonary roentgenograms. Singer and Graham were the first in America in 1925 to recognize this shadow as a sign of atelectasis and bronchiectasis of the lower lobe. Anspach has reported a study of fifty of these cases in children. He found that, where this triangular shadow fluctuated in size and density from one examination to the next, only tubular bronchiectasis developed. Or the chest cleared up with little or no evidence of dilatation of the bronchi. When drainage did not occur with frequent re-expansion of the lobe or lobules, saccular bronchiectasis resulted. This latter occurred in the finer more distal bronchi in which thick secretion easily produced complete obstruction. He thinks that allergy may aid in bringing about the initial obstruction by the swelling of the mucous membrane and the production of thick tenacious secretion.

With other writers Anspach believed atelectasis was the precursor of adult bronchiectasis. Very frequently permanent damage occurred in the lung in early infancy and, even though dilatation did not occur, the bronchi were left in a weakened condition. This, he suggested, aided in the development of bronchiectasis with associated clinical symptoms in adult life. The research study by Robinson, of Toronto, who reported on the pathology of 16 lobectomies for bronchiectasis, would seem to corroborate this view.

It is therefore interesting in this connection that, since the advent of pneumonography and the widespread use of lipiodol, various writers have shown that dry bronchiectasis exists, as evidenced by bronchial dilatations. This has been noted in both children and adults. Wall and Hoyle, in citing 30 cases from the literature and reporting 20 of their own cases in two years, concluded that dry bronchiectasis was extremely common and that the great danger lay in the development of a wet bronchiectasis.

INFECTION OF THE TRACT AS A WHOLE

There has been a tendency amongst a number of writers to describe infections of the mucous membrane of the respiratory tract as separate entities instead of as a whole. The reaction of the mucous membrane in infection is much the same, whether in the nose or thorax. It is interesting therefore to find in a fœtid bronchiectasis changes in the mucous membrane very similar to those seen in the nose in atrophic rhinitis with ozœna. Both have been attributed to a multitude of bacteria, while numerous theories have been cited in each to describe their etiology. Recent investigation is helping to increase our knowledge of the reaction of the respiratory tract to allergy. Bronchiectasis has been produced in guinea pigs experimentally by vitamin deficiency. And the investigations of Dean and Hetler have shown that vitamin A deficiency will produce sinusitis in monkeys but a vitamin-high, protein-deficient diet will produce both suppurative sinusitis and otitis. While specially planned diets have been shown to be of great value in upper respiratory infection, Dean has emphasized the fact that sinus disease cannot be cured by diet alone. And Fenton has shown experimentally that in well nourished cats special diets will not arrest acute sinusitis. or prevent its development into chronic sinusitis.

The histiocyte system has been found by Fenton and his co-workers to take up early defensive measures in the sinus and ear membrane during acute invasions or acute exacerbation of chronic processes. Plasma cells have been found to the exclusion of histiocytes in all late and chronic stages of inflammation and repair. Sippe, in a recent article, has suggested that hypoglycæmia and ketosis may play a part in both children and adults in chronic antral disease and bronchiectasis. He reports 9 cases, 3 early with complete relief of symptoms, and 6 advanced cases that showed considerable improvement following the administration of glucose. While these results are too small from which to draw any conclusions, he suggests that many of those who develop chronic sinusitis and pulmonary fibrosis have an exudative diathesis as the basis for the development of lesions of the respiratory tract. Frequently this inability to retain water in the tissues is due to an insufficient supply of available glucose as evidenced by hypoglycæmia or ketosis.

While it is still true that there are many exceptions, all our present evidence would tend to show them that a suitable soil is developed in early childhood for subsequent infections of the respiratory tract. A sinusitis, taking part in the involvement of the whole respiratory tract, may date from infancy, the constant overflow of secretion being sufficient to keep the bronchial condition active. Or the sinusitis due to influenza or the infectious diseases occurring in later life finds in the bronchial mucous membrane a soil suitable for the development of bronchiectasis. While some patients with bronchiectasis do not show any evidence of sinusitis, even after the most thorough examination, the possibility that sinus infection might have been present at some time cannot be excluded. In view of our more recent knowledge it is perhaps reasonable to assume that in these patients the sinuses shared the primary infection of the whole respiratory tract. Due to good drainage the upper portion of the tract cleared up, while the extreme degree of pneumonitis present prevented the lower portion from doing so. Considerably more investigation is needed to decide just what part allergy or the question of hypoglycæmia play in sensitizing the whole tract to infection.

TREATMENT

The discussion of the treatment of bronchiectasis is beyond the scope of this paper. There is, however, general agreement that, once bronchial dilatation has occurred, only radical surgery, with unfortunately still a high mortality rate, is successful in curing this condition. And, while operation upon the nasal accessory sinuses will not cure bronchiectasis, any focus should be, where possible, removed before surgical treatment of the lung is instituted.

It is in children that the best results will be obtained from conservative treatment and this should be commenced early. The upper respiratory tract should receive active treatment. This usually means simply relief of mechanical obstruction resulting in free drainage. Bronchoscopic suction, postural treatment and vaccine therapy all have their part. Children with sinusitis, who have frequent attacks of bronchitis and pneumonia, should be regarded as potential cases of bronchiectasis. They should be carefully guarded in so far as climate, diet, air contamination and work are concerned, in order to protect the respiratory tract from further infection.

SUMMARY

1. The association of non-tuberculous bronchiectasis and paranasal infection is extremely common.

2. The pulmonary collapse and pneumonitis, frequently found in early childhood, so weakens the lung structure that a suitable soil for subsequent infection occurs.

3. Bronchiectasis, as evidenced by the number of dry cavities reported in both children and adults, is more frequent than was previously supposed.

4. Sinus infection, associated with bronchiectasis, may date from early childhood or occur as a secondary infection in later life.

5. The treatment of bronchiectasis is surgical. Any focus of infection should be, where possible, removed from the upper respiratory tract before lung surgery is attempted. The best results will be obtained from medical treatment if it be commenced in early childhood.

A list of references can be found in the *Archives of Otolaryngology*, 1935, **22**: 544.

SUBCUTANEOUS EMPHYSEMA COMPLICATING TONSILLECTOMY*

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SUBCUTANEOUS emphysema as a complication of tonsillectomy is not particularly unusual. It is apt to prove rather alarming to the younger otolaryngologist and decidedly disconcerting to the patient. The literature contains relatively few cases, but the condition has occurred in this clinic with sufficient rarity to warrant recording a recent case. A number of cases from the recent literature are introduced for comparison.

CASE REPORT

The patient was a female, aged 27, with a history of many sore throats and colds. Peritonsillar abscess, night sweats, loss of weight and cough were all denied.

The temperature, pulse and respirations on admission were normal. The tonsils were of the submerged type, appearing rather fibrosed. No pus could be elicited on pressure.

The heart sounds were normal; the blood pressure 124/70. Chest: resonant throughout to percussion, and no râles were heard. The remainder of the physical examination was essentially negative. On March 11th the tonsils were enucleated under a general anæsthetic. (Gas induction to intratracheal ether.) Induction was easy. The duration of the operation was 38 minutes. The technique was the modified Sluder method. The bleeding was rather profuse from each side. It was controlled with swabs and pressure. It was necessary to place three No. 0 catgut sutures in the upper, middle and lower thirds of each fossa. The sutures were quite deeply placed, to control the profuse type of bleeding, and the fascia over the superior constrictor muscle was damaged in each fossa.

The patient was seen about one and one-half hours after the operation, when the nurse reported that she was screaming, struggling and coughing. This had occurred while she was coming out of the anæsthetic. She was given a hypodermic of morphia (gr. 1/6), and within ten minutes became quiet and slept for about two hours. The morphia was repeated every three hours for three doses. No hæmorrhage had occurred after the operation. The next morning the patient complained of swelling of her face and neck, and was rather alarmed. Examination revealed a moderate amount of painless swelling extending over the angles of both mandibles and downwards to the clavicle. Palpation showed crepitations over all the swollen areas. Inspection of the pharynx revealed the usual post-operative reaction but no bubbles were seen in the saliva. The lungs were negative on examination.

The second and third days after operation brought no change in the surgical emphysema. The patient did not complain of any pain or discomfort in the swollen regions, but was rather perturbed by the crackling on pressure. The fourth and fifth post-operative days showed a gradual disappearance of the swelling, and on the morning of the sixth day it had entirely gone. Daily lung examinations were negative. The temperature was within normal limits, except on the second and third days when a slight elevation of 99.2° was present. Daily examination of the pharynx showed only the usual post-operative reaction. There was no œdema of the uvula. Her voice was unchanged. The routine post-operative treatment was carried out, including an ice collar and crushed aspirin, grs. v, before meals. No specific treatment for the emphysema was used. The patient was discharged on the seventh day after operation with no evidence of the emphysema. She was taking a soft diet with no difficulty on discharge.

DISCUSSION

Keen[1] reports a case in a child, admitted thirty hours after tonsillectomy with a history of an acute choking attack and severe collapse. The temperature was 103°; pulse 160; and respirations 60. Subcutaneous emphysema was present over the anterior and posterior aspects of the chest and the lower cervical regions. The throat showed the post-operative findings, and subsequent healing was normal. The lungs revealed no obvious dullness, and auscultation was hindered by the emphysema, but the lungs subsequently were found to be normal. The emphysema was entirely cleared at the end of eleven days. Keen believes that in this case the choking attack was due to some laryngeal irritation such as a blood clot arising in the tonsillar beds. The clot caused obstruction of the glottis, and the violent expiratory efforts led to lung distension and a rupture of one or more alveoli. The air was forced along the hilus to the mediastinum and thence to the cervical regions. Keen quotes three cases of Von Hoff in which the emphysema involved the face and neck, and cleared within three to five days. One case is suggested to have resulted from a ruptured alveolar vesicle, as the patient (a child) struggled and cried. The second case is believed to have had the portal of entry for the air through the tonsillar fossa. It is explained that air may enter through the loose areolar tissue about the great vessels when the fascia of the superior constrictor and buccinator muscles is torn during operation or with sutures. The third patient is considered to have had the air pumped into the parotid gland through Stensen's duct by the ether pump, and

* From the Department of Ear, Nose and Throat of the Montreal General Hospital.

from there diffused. In this case the emphysema first was noted over the parotid area.

Stevenson[2] gives an instance of the occurrence of surgical emphysema after tonsillectomy. The dissection method with general anæsthesia was used. Six hours after operation the patient complained of bubbles in his saliva. Examination showed subcutaneous emphysema extending from the forehead to the clavicles, with the eyes, cheeks and neck being most swollen. There was no laryngeal œdema and no swelling of the mouth or throat except the usual post-operative findings. The emphysema did not disappear for five days, the forehead being the last region to clear. Stevenson quotes a case of A. S. Woodwark[3] in which surgical emphysema of the head and neck followed the perforation of the anterior pillar of the fauces by a broken pipe stem. Stevenson concludes that in his case the point of entry of the air was through the muscle fibres of the empty tonsil beds.

MacCready[4] describes two cases in some detail.

> The first was that of a man, aged 65, who had had a tonsillectomy under local anæsthesia. The dissection technique was employed. One hour later a swelling was noted about the left eye. The patient had been coughing hard and was apprehensive. On palpation crackling was found. A sedative was given and the patient cautioned not to cough. Twenty-four hours later the swelling was almost gone and had entirely disappeared in forty-eight hours.
>
> The second case was that of an obese female, of forty-eight years. The tonsils were removed under general anæsthesia, using a Sewall-Davis gag and blunt dissection. The tonsils were large, scarred and adherent. A fair amount of bleeding was controlled by catgut sutures in each fossa. At the end of the operation CO_2 and oxygen were given and the patient went into a spasm and had a terrific expiratory effort with tightly clenched teeth. During this time a marked swelling about the left eye appeared, involving both the upper and lower lids and completely closing the eye. Swelling was also noted on the left side of the neck. Palpation revealed crackling over the swollen areas. The swelling was nearly gone within twenty-four hours and entirely so at the end of forty-eight hours.

MacCready points out that the emphysema developed regardless of the type of anæsthesia, occurring in the first patient during an attack of coughing, and in the second during the spasm of clenched teeth, plus a violent expiratory effort. In both cases the pharynx was clear and no bubbles were noted in the saliva. MacCready believes that the determining factor was the tremendously increased intrathoracic pressure, and that the emphysema was of alveolar origin.

Dickinson[5] quotes one case, and believes that all of these complications occur during general anæsthesia.

SUMMARY

1. Surgical emphysema after tonsillectomy is not particularly unusual.

2. It may occur during either general or local anæsthesia, requires no special treatment, and has no serious results.

3. It may be immediate or delayed.

4. It occurs both in adults and in children.

5. It has been reported in cases in which the Sluder technique and the dissection method were employed.

6. The origin of the air may be through the rupture of one or more alveoli, or through the damaged muscle fibres of the tonsillar fossa.

7. The case presented appears to have both of the causative factors, as the tonsillar beds were damaged and the coughing and screaming provided the violent expiratory efforts. No predominating cause seems to have been present, and there apparently was a combination of the two forces.

I wish to acknowledge my thanks to Dr. Geo. E. Hodge for help in preparing this report and to Dr. F. B. MacNaughton for permission to refer to this case.

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A SYNTHETIC LIGATURE MATERIAL.—H. J. v. Brandis (*Zentralbl. f. Chir.*, Feb. 15, 1936, p. 372) and also W. König (*ibid.*, p. 377) report satisfactory trials of a new synthetic suture and ligature material. It is described as a polymeric compound of vinyl alcohol, and is a reversible colloid like hæmoglobin or globulin. It is water-soluble and heat-resistant, and the threads are produced at a temperature of 130 to 140° C. under a pressure of 100 to 150 atmospheres. The tensile strength is strength is equal or superior to that of catgut. The special advantages claimed for it are its unquestionable sterility and its lack of irritative or poisonous properties. It is not absorbed in the tissues. The authors have used the material in abdominal, brain, joint, kidney, and hernia operations, but Brandis prefers to retain catgut for gastro-intestinal suture and anastomoses.—*Abs. in Brit. M. J.*

CANCER: AN EFFECTIVE OFFENSIVE*

(THE EVOLUTION OF SASKATCHEWAN'S ANTI-CANCER CAMPAIGN),

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IN the unfavourable situation which cancer statistics annually portray throughout America, legitimate reason is to be found for advancing a further plea on behalf of more effective offensive measures.

We find that the cancer death rate in the United States in 1921 was 85.6 and accounted for 76,274 cancer deaths. Twelve years later, in 1933, the rate is seen to have risen to 102.2, and 128,479 lives were exacted. In Canada, in 1921, the death rate because of cancer was 72, and there were 4,826 cancer deaths. In 1933 the rate was 100 and the total deaths numbered 10,653.

In the two countries in 1921 there were 81,100 deaths; in 1933, cancer claimed 139,132 lives. In this one sees that not only has the cancer rate shown a consistent annual increase, but, further, in the short period of thirteen years there has been an increase in the sacrifice to cancer of some 58,032 lives. A critical analysis of the data available in this regard by no means satisfactorily explains this situation as being entirely due to better diagnosis or to an increased age incidence, as is sometimes urged.

The dominant position which cancer commands in exacting human life is visualized in the accompanying Table.

In our Province (Saskatchewan), we look upon the statistical situation in relation to pulmony tuberculosis and cancer with pride.

In the case of tuberculosis, thanks to vision, efficient organization, sound educational endeavour and ample provision for free centralized diagnostic and therapeutic clinics, very definite accomplishment has been registered. It is noted that the pulmonary tuberculosis rate dropped from 43 in 1921 to 29 in 1932. In this splendid attainment a more favourable situation is not to be found in America.

As pertaining to cancer, it may be advanced that Saskatchewan's present low rate is largely due to a favourable age incidence. In 1921 the cancer rate was 39; in 1932 the rate is noted as having risen to 61. While the 1932 rate is, comparatively, still quite low, the annual increase in the rate has excited apprehension, and, in consequence during the past five years

TABLE I

THE TEN MOST FREQUENT CAUSES OF DEATH

(Canadian Vital Statistics, 1932)

Disease condition	*Total deaths*	*Rate per 100,000*
Heart disease	15,320	146
Cancer	10,014	*95*
Diseases of early infancy	7,923	76
Infectious diseases	8,467	*82*
Pneumonia	7,024	67
Arterial disease	6,800	65
Violent deaths	6,629	63
Pulmonary tuberculosis	5,836	*56*
Nephritis	5,531	54
Influenza	4,220	40
Enteritis	3,734	36

Saskatchewan has been striving to arrange a type of anti-cancer program which will permit us to maintain more effective control over the situation.

How can we most successfully control the menace which cancer constantly brings into our social and economic life?

Accumulating testimony would appear to suggest that the profession is not satisfied with present levels of attainment, and it is quite inconceivable that either the actual or the potential victim of cancer can find consolation in existing programs, or in present average accomplishment, for by no means do they represent potential attainment. In an endeavour to place the question, that of initiating a more effective offensive above that of purest theory or personal viewpoint, it is conceivable that a study of a hypothetical situation might assist us. In such, let us entirely draw upon that

* A paper read at the conjoint meeting of the American and Canadian Medical Associations, in Atlantic City, June 13, 1935.

intensively accumulated experience and direction which constantly emanates from the world's outstanding cancer centres, and which is already a matter of definite record.

The findings of an expert committee, which supposedly has been invited to prepare an answer to the problem of making provision for efficient organization, conceivably might be briefly listed as follows:

1. The situation in relation to cancer is now of such nature that the exhibition of more effective offensive measures becomes imperative.

2. In that cancer, primarily, is always a definitely local condition, and in that its first appearance is frequently antedated by a site of chronic irritation which lends itself to successful treatment, it may be said, with much truth, that cancer is both preventable and curable.

3. In that the initial primary growth, however small and insignificant in appearance, lacking early recognition and adequate treatment, invariably extends and terminates in exacting the life of the victim, the necessity for providing an adequate anti-cancer program becomes clearly comprehensible.

4. In so far as is practical provision for the prevention of malignancy must be provided. In this, provision for the recognition and the eradication of all accessible pre-malignant states becomes a primary necessity. Further, it is obligatory that malignancy should be diagnosed at the very earliest possible stage of its evolution, and that treatment should be instituted at once. Also, pertaining to treatment measures, it is necessary that these should be of such nature as to ever surround the patient with every possible safeguard.

5. Research measures, in relation to cancer's etiology and how most effectively to utilize all available therapeutic measures, must, of necessity, ever be advanced.

6. The adequate fulfilment of the basic necessities in organization becomes a practical consideration in the measure that we are prepared to squarely face all the facts in the situation. We must most meticulously assay and adequately appraise our total resources and liabilities, and, finally, we must be prepared to meet the indications which are thus revealed.

7. Definite progress in the direction of cancer conquest, a comprehensive goal, becomes feasible in the measure that the profession and the potential or the actual victim of cancer unite in sharing a common viewpoint in relation to etiology, prevention, early recognition and adequate treatment. Prof. James Ewing has said that in the full and efficient application of present knowledge cancer deaths could be reduced to one-third the present proportions. Unwarranted pessimism and misconception have too long been permitted to becloud our vision and thus to forbid greatest attainment. In this we find, in part, explanation for continued adherence to time-tattered conceptions, traditional tendencies, discredited practices, and discarded theories, all of which forbid higher levels of attainment. Only in the institution of an adequate educational program does it become possible to harmonize present conflicting viewpoints.

8. An educational program must be of such nature that it will definitely assist the general profession to acquire a more practical and a more thoroughly modernized viewpoint in relation to the prevention of and the earliest possible recognition of malignancy. Further, the necessity for at once instituting early and thoroughly efficient treatment must become definitely established. In this it is of vital moment to recall that it is the general practitioner who, in large percentage incidence, makes the first contact with situations which suggest the possibility of malignancy. Thus, the general practitioner is one of the most important factors in a program which avows, as its objective, cancer conquest. Also, the public must be made to become practically familiar with the simple fundamentals which suggest the possibility of cancer and also with those indications which point to the necessity for securing expert opinion. Only in an adequate educational endeavour does this become possible. The practical suggestion, that of instituting periodic health examinations, should be made to become an unquestioned routine.

9. In the treatment of cancer, accumulated experience has definitely served to accentuate the necessity for intensively accumulated skill and experience; also for the adequate correlation of all helpful therapeutic agencies. This only becomes possible in centralized diagnostic and therapeutic cancer clinics. In no other way are the essential facilities made practically

available. Adequate treatment cannot be said to consist of other than the most skilful and thoroughly coordinated association of all helpful measures.

Occasional adventures in the field of cancer surgery and radiotherapy not only prohibit a maximal measure of therapeutic attainment, but, further, such excursions serve to definitely discredit otherwise worthy procedures. In no sense does the excision of a malignant tumour, the exhibition of x-rays, or the application of radium constitute cancer surgery on the one hand or radiotherapy on the other. The extensive nature of their experience, skill and accomplishment alone should serve in designating cancer surgeons and radiotherapists. Forssell has given practical point in this in the quotation "The nature of the primary attack determines the final issue".

10. The possibilities that lie in adequate surgery have long since been established. They are perfectly comprehensible and quite possibly will never be exceeded. On the one hand they are defined by the skill and experience of the surgeon; on the other hand they become circumscribed because of the necessities which anatomical considerations impose as insuperable barriers.

In recent years the scope of radiotherapeutic accomplishment has rapidly extended and already radiotherapy is preferred in many sites. In that the field of its potentiality has by no means been defined, research must ever be advanced in an attempt to disclose inherent virtue which may still lie undisclosed. To radiotherapists and to surgeons is given an opportunity, through cooperation, to raise the present therapeutic accomplishment to a much higher plane.

11. Admittedly, the gulf which lies between average and potential therapeutic accomplishment is formidable, but by no means do the difficulties forbid the bridging of this impediment. In the field of breast and uterine cancer in America there were 12,940 deaths in 1932. It is a matter of record that average accomplishment provides favourable five-year end-results in less than 20 per cent of all operable cases in these fields. Under more ideal situations there is dependable authority for the viewpoint that these end-results could be raised fourfold. In this tremendously increased accomplishment there is involved the thorough application of but a few very simple principles. In many other sites, through organized effort, improved end-results are similarly to be obtained.

12. To medical schools is given an exceptional opportunity, that of establishing the ideals and the essential scientific knowledge which alone can make for improved attainment. In the adoption of more complete uniformity in our system of medical instruction our teaching schools would thus be enabled to provide one of the most tangible assets in the field of cancer endeavour, uniformity in conception and in procedure. Unfortunately, by no means do recent graduates in medicine uniformly evidence such teaching, and the greatest variety in viewpoint is to be found in the profession in general. In such variety of individualistic viewpoints there is ever to be found an impediment to progress.

13. In that we now recognize that cancer, in no small degree, is preventable, that the practical attainment of earlier diagnoses is feasible, that ignorance, fear and dilatory attitudes, all capable of correction, largely contribute in providing fatal misdirection and the terminal disaster which so frequently occurs, it is essential that the elimination of these disastrous situations should be established as a much more practical objective in our departments of public health.

14. In the wealth of medical literature, in relation to cancer, there is great virtue; in the complexity of the viewpoints which are constantly advanced great weakness is manifest. A uniform type of practical literature made constantly available to the general practitioner, assessed by capable and experienced workers, would prove of inestimable value. This becomes a practical consideration in the measure that a centralized directing body, selected solely and entirely because of their special knowledge, enthusiasm, and intensive experience in the practical field of cancer, constantly functioned in attempting to maintain uniformity in thought and procedure.

In Saskatchewan an endeavour to evolve a more effective offensive movement is in process of evolution. But five years ago, a cancer committee, the first of its kind in the Province, was appointed by the Saskatchewan Medical Asso-

ciation. At the same time the Association invited the Canadian Medical Association to undertake to provide a national cancer organization. In this it is gratifying to be enabled to state that not only was this the preliminary step in the direction of a Dominion anti-cancer organization, but, further, already much has been accomplished.

One year later (1931) a plan of organization, which involved the principles in anti-cancer organization and to which reference has just been made, was prepared and widely circulated for criticism. Amongst others, Forssell, of Stockholm, Regaud, of Paris, Lord Moynihan, of Leeds, Ewing, of New York, Kelly, of Baltimore, Pfahler, of Philadelphia, Rankin, for the Mayo Clinic, and Capt. Chapman, for the British Empire Campaign, graciously forwarded their viewpoints. In that these men, all outstanding in the field of cancer endeavour, registered an entirely uniform type of endorsation and encouragement, the assumption that these organization principles were basically sound was accepted as established. In further substantiation, in the same year the Radiological Section of the Canadian Medical Association unanimously endorsed them. Further, a resolution was passed and forwarded to the Council of the Canadian Medical Association again stressing the necessity for a National Cancer Organization. Significantly, the most admirable principles of organization, those which have been outlined by Prof. Gosta Forssell, and by Prof. Regaud, were particularly cited and recommended as an ideal source of direction in such an undertaking.

In full knowledge of these principles, and in complete sympathy with the conception of more fully safeguarding the interest of the cancer victim, to its credit, our Provincial Government, through the Department of Public Health, set up a cancer commission, undertook the purchase of radium, established an emanation plant, arranged for other essential facilities, and opened two centralized Cancer Clinics. The first Clinic opened in December, 1931, and the second a few weeks later. Since that date these Clinics have continued to function and have gradually accumulated a most valuable experience in relation to the necessities of organization and how better to serve the victim of cancer.

No experienced cancer worker will visualize in this brief period of activity an experience of unparalleled success, or will conjure up the picture of an altogether triumphal march, in as much as it is a matter of unfortunate experience that the factors which combine to retard progress not infrequently appear infinite in both number and variety. Let not the impression be entertained however, that the undertaking, because of the difficulties and the limitations which have been imposed and which have served to prohibit a greater measure of accomplishment, is viewed as a forlorn hope. On the contrary, the impediments which have been faced have but served to quicken interest and to intensify the determination to eliminate the present handicaps. As an example, the Cancer Committee of our Saskatchewan Medical Association very recently exemplified its faith in its endeavours by restating its position in relation to organization. In this the necessity for the closest possible adherence to those fundamental principles which had been initially advanced were stressed. In a review of this memorandum, Prof. James Ewing stated that in his opinion it was quite the most efficient plan of organization that he had seen. This has proved most heartening. In a recent public address on the subject of cancer organization, the Minister of Public Health (Hon. Dr. Uhrich), and its is under this particular jurisdiction that the present clinics function, fittingly described the situation when he said "In our present experience, we are now permitted to recognize weaknesses and defects and to prepare a more effective organized plan of attack."

From outside the province, it has been gratifying to find that Saskatchewan's program has attracted nation-wide attention and careful study, as is seen in the fact that the Departments of Public Health in practically every Province in the Dominion, after studying it, have not only endorsed the principles involved but have expressed their endorsation of a plan to establish a unified system of Dominion anti-cancer organization.

That interest in initiating and in advancing an anti-cancer offensive is not solely limited to the medical profession is found in the observation already made by many of Saskatchewan's most outstanding educationalists, to the effect that the simple basic facts in relation to cancer

might well be taught throughout the Province's educational institutions. In this suggestion, that of attempting to establish a sane but adequate cancer-consciousness in the mind of the rising generation, beyond question there is the greatest virtue. That the allied professions may be of the greatest service in advancing such an undertaking, Saskatchewan has found in the practical activities which both the dental and the nursing profession have already initiated in this regard.

It is gratifying to be enabled to briefly recite these facts derived from Saskatchewan's limited experience in attempting to establish a more effective offensive in the field of cancer endeavour.

Clinical Conferences

RECURRENT PULMONARY ŒDEMA WITH CEREBRAL LESION*

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The vascular accidents that may occur in the course of chronic arterial hypertension afford interesting opportunity for clinical and pathological studies. The patient presented today has had recurring attacks of acute pulmonary œdema during the past few years, and very recently has suffered a severe cerebral insult due to a vascular lesion in the left half of the brain.

Clinical History

This 66-year old coloured woman, was admitted to the Johns Hopkins Hospital (Medical Service of Prof. Warfield T. Longcope) on December 29, 1935, just one month ago.

Past history.—For some 15 years the patient has complained of ringing in the ears, headaches and dizziness. Nine years ago she began to be troubled with cough, and states that she bled repeatedly from the nose; in the following year she began to have attacks of shortness of breath during the night, and about five years ago began to have some precordial pain.

In January, 1932, she had a sudden attack of shortness of breath after climbing a short flight of stairs and produced frothy pink sputum. She was taken to the accident room of this hospital where venesection was promptly done for relief. She was admitted to the ward, where she remained about a month. The study revealed a marked arterial hypertension (systolic pressure 230; diastolic 135), in association with marked arteriosclerosis, enlargement of the heart, myocardial insufficiency (with pulmonary œdema, passive congestion of the liver, and œdema of the ankles), and nephropathy, with albumin and casts in the urine. The Wassermann test was negative. There was a slight secondary anæmia (hæmoglobin 70 per cent). After the venesection, under a régime of rest, restricted diet, and the administration of digitalis, the patient improved steadily, though the blood pressure remained at the same high level.

Early in 1934, the patient was re-admitted to the hospital because of another attack of acute pulmonary œdema. After removal of 500 c.c. of blood from a vein, she was treated as before and made a similar improvement, though during the convalescence she had one mild generalized convulsive seizure. Her blood pressure was 220 systolic; 115 diastolic. After a three-weeks' stay in the ward she was discharged, being told to continue digitalis therapy and to report regularly to the medical out-patient department, directions that, however, she failed to follow. In July of the same year she again appeared in the accident room of the hospital in a third attack of acute pulmonary œdema. Owing to the pallor of her mucous membranes it was thought best not to bleed her, but she responded well to morphine and atropine, together with temporary constriction of all four extremities. She was kept in the ward for some five weeks. On admission at that time her blood pressure had fallen to 150 systolic, 85 diastolic; her pulse rate was 120, and her respiratory rate 44. Under rest and digitalis she rapidly improved. Before she left the hospital four infected teeth were removed.

In mid-October, 1935, she re-appeared in the accident room in her fourth attack of acute pulmonary œdema. After venesection, she was sent to the ward, placed in an oxygen tent, and given digitalis again. Her blood pressure at this time was 190 systolic, 115 diastolic; there was some secondary anæmia (hæmoglobin 72 per cent). Cataracts were found to be developing in both eyes. At the end of a fortnight she was discharged, admonished to sleep on the first floor of her house, never to climb stairs, and to continue the use of digitalis regularly.

Present admission.—Despite the strict injunction against stair-climbing and other exertion, the patient continued to use the stairs of her house and to do some of the housework, stating that aside from some shortness of breath, recurring headaches, and some pain in her right knee (in wet weather) she had felt very well. On the night of December 29, 1935, she felt as well as usual on going to bed, but awoke in the night with severe dyspnœa, cough and frothy blood-tinged sputum (her fifth attack of acute pulmonary œdema). Brought again to the accident room of the hospital, venesection gave relief, and she was re-admitted to the ward.

The principal positive findings on this admission included arteriosclerosis, with blood pressure 185/100, enlargement of the heart, systolic blow at the apex, presystolic gallop, moist râles at the bases of the lungs, and sluggish deep reflexes in the lower extremities. The patient had a slight pharyngitis and the teeth and gums were in poor condition. There was slight secondary anæmia (hæmoglobin 80 per cent) and the non-protein nitrogen of the blood was 44 mgm. per cent. The urine contained a little albumin and a few casts; the phthalein output was 42.5 per cent in two hours. An electrocardiogram, made four days after admission, revealed normal sinus rhythm, pulse rate 85, and lævogram. Measurements in the teleroentgenogram: M.R. 5, M.L. 12, A. 6.2, T. 27.6.

On January 3rd, five days after admission, another attack (her sixth) of acute pulmonary œdema developed. Though this was promptly relieved by the administration of morphine and atropine and by the application of

* Thursday Clinic to the Senior Students of the Johns Hopkins Medical School, January 30, 1936.

tourniquets to the lower extremities, she suddenly developed about one hour later a right hemiplegia with conjugate deviation of the eyes to the left and with temporary loss of the deep reflexes on the right side. By the next day, the motor power of the right lower extremity had returned and there was partial return of power in the right upper extremity, the residual weakness in the fingers and at the wrist being more marked than at the elbow and the shoulder; complete paralysis of the lower right face and tongue persisted, and there was still some weakness in the domain of the right upper face (*M. frontalis*; *M. orbicularis oculi*). The deep reflexes in the upper extremities were active and equal on the two sides, but were sluggish in both lower extremities; the Babinski test was negative on both sides. Dr. Grossmann said that there was loss of the power of speech, but at the time he could not be sure whether this meant an aphasia or merely an anarthria. He referred the clinical picture to a cerebral vascular accident, probably a thrombosis of the anterior branches of the left middle cerebral artery. After the attack, the patient had to be fed by tube for over two weeks. Two weeks after the paralysis a transient generalized clonic convulsive seizure occurred. This disappeared after a few minutes, leaving no residual signs, and was attributed to a hypertensive crisis. She had had a similar convulsive seizure during her convalescence from the attack of acute pulmonary œdema early in 1934.

By January 23rd the general condition of the patient was better. She was able to swallow again and the tube feeding could be discontinued. Dr. Eichna found that the distal part of the right upper extremity was still weak, the paralysis of the lower face on the right persisted, and there was partial analgesia of the same area. Though the patient could hear, she could not understand what was said to her, apparently suffering from "word deafness". When spoken to by name, she would look at the examiner but would make no other response. When told to shut her eyes, to look toward the right or the left, or to raise her hand, she did not obey the command. When the examiner passively performed an act for her (for example, raising her hand to her mouth) and then by gesture indicated to her that he desired her to make the motion herself, she would not only do so but would continue to repeat the act over and over again even though the oral command was changed (perseveration). In order to get her to do something else, it was necessary to demonstrate to her by passive movement the new act desired. That she was not apraxic was shown by the fact that a glassful of water held before her was grasped and drunk and the glass put aside afterwards. Whether word-blindness existed or not could not be determined, since the patient is illiterate; certainly this was no pantomime-blindness, for movements performed before her would be imitated by her, showing that she understood signs. The patient handled objects with the left hand very well, but not with the right hand, because of weakness. There was a suggestion of right hemianopsia, since objects brought toward the patient from the right were not noticed as quickly as those brought toward her from the the left. There was marked jargon-aphasia and possibly some motor aphasia.

Localization of the Neurological Lesions

All the evidence points to the sudden development of a lesion in the left cerebral hemisphere. The right hemiplegia, with its residual facio-linguo-brachial paralysis, indicates involvement of the lower part of the left anterior central gyrus, especially of the areas in which the pyramidal tract fibres innervating the muscles of the face, wrist, and hand have their origin. The disturbance of sensation in the right side of the face points to involvement of the lower part of the the left posterior central gyrus. The lack of understanding of speech and the distortion and confusion of words produced, combined with a perseveratory tendency (receptive or sensory aphasia; jargon-aphasia), points to injury of the left superior temporal gyrus and perhaps of the inferior parietal lobule, especially as there was conjugate deviation of the eyes to the left at onset. The motor aphasic element suggests some involvement of the posterior part of the left inferior frontal gyrus (Broca's area). Right hemianopsia frequently accompanies sensory aphasia and may be due to extension of the lesion into the white matter deep enough to injure the left optic radiation.

Nature of the Neurological Lesions

Paralysis and aphasia occurring suddenly in an elderly patient who has arteriosclerosis and chronic arterial hypertension make a vascular accident seem certain as the cause of the symptoms. The symptoms and the area of the brain involved point to the domain of the left middle cerebral artery and indeed to the domains of all its distal branches. The monoplegia facio-lingualis dextra, together with paresis of the right arm and some motor aphasia, points to the first and second branches that supply the parts of the anterior central gyrus affected and the inferior frontal gyrus; the word deafness, sensory aphasia, and possible right hemionopsia point to the domains of the third, fourth and fifth branches that supply the superior temporal gyrus and the inferior parietal lobule.

The three types of vascular accident that may occur in this region include (1) embolism, (2) hæmorrhage, and (3) thrombosis. Embolism or thrombosis would be followed by cerebral softening (encephalomalacia), whereas hæmorrhage would exert its effects through local pressure and destruction. Can we decide upon which of the three types of vascular accident has occurred here?

First, as to the possibility of embolism, the age of the patient favours the idea of either hæmorrhage or thrombosis rather than embolism, since embolism is far more common in youth than in age. The absence of evidence of valvular lesions of the heart is also against the idea of embolism. though occasionally an embolus has had its origin in an atheromatous heart. On the whole we are fairly safe, I think, in ruling out embolic infarction in this patient.

When we try to differentiate between cerebral hæmorrhage and cerebral thrombosis the difficulty is greater. Both are common in later life. In cerebral apoplexy the blood pressure is nearly always high, but it must be remembered that it has been found high also in about half the cases of softening of the brain due to thrombosis. Moreover, a hæmorrhage large enough to injure the lower parts of the anterior and posterior central convolutions, the inferior frontal convolution, the superior temporal convolution, and the inferior parietal lobule would almost certainly have given rise to a comatose condition and to have been followed by some fever. Because of the wide area of brain substance involved without more disturbance of consciousness than occurred in this patient and without later elevation of temperature, it would seem very probable, I think, that we have had to deal with thrombosis and softening rather than with hæmorrhage.

Brief Discussion of the Present Conceptions of the Aphasias

Since the earlier publications of Broca on motor aphasia (75 years ago), of Hughlings Jackson (72 years ago), and of Wernicke on sensory aphasia (over 60 years ago) an immense number of publications upon the aphasias has been made. In this country, the studies of the late Charles K. Mills, of Adolf Meyer, and of T. H. Weisenburg have been outstanding. In England very important contributions were made early by Hughlings Jackson, many of

whose ideas were in accord with some of the newer developments, but his papers did not receive the attention that they deserved for nearly 50 years, owing to the overshadowing predominance of the views promulgated by Broca and by Wernicke.

After the studies of Broca and Jackson, many attempts were made to localize precisely the centres for language in the cerebral cortex and to determine their inter-connections. Particularly active in this work were Bastian and Broadbent in Great Britain and Wernicke in Germany. Elaborate maps of the cortex and of the fibre-connections were constructed; Head has amusingly referred to this period as that of the "diagram makers". Marie, of Paris, in 1906 struck a hard blow at the complexity of the systems that had been promulgated, and endeavoured to simplify the situation by a revision of the doctrines of aphasia, maintaining that Wernicke's sensory aphasia was the only true aphasia, that the so-called "pure motor aphasia" should be designated "anarthria" and that Broca's aphasia should be regarded as a combination of anarthria with Wernicke's sensory aphasia. He also laid stress on the fact that in true aphasia there is not only a defect in a special language intelligence but also a defect in general intelligence.

Though, later on, efforts to continue research on aphasia from the standpoint of localization were made by many, still more valuable contributions came from those who laid especial stress upon clinical studies and upon psychological investigations of patients exhibiting aphasic symptoms. In 1913, Pick published his important treatise on "agrammatism" and, later on, contributed further to psychological explanations of the disturbances of language and of thought in the aphasias. In 1926, Henry Head published his two volumes entitled "Aphasia and Kindred Disorders of Speech" and is noteworthy for his grasp of the complexity of the process of disintegration of language and for his insistence upon more systematic studies of patients. In recent years, Goldstein, of Amsterdam, has studied aphasic responses by the method of qualitative analysis and has related amnesic aphasia to a disorder of so-called "categorical behaviour". During the past four or five years, Weisenburg and his associates in Philadelphia have conducted extensive researches upon the problems of aphasia, aided by a grant from the Commonwealth Fund, applying new methods of investigation, and studying normal persons and patients with cerebral lesions but without aphasia for comparison with patients who had aphasia.

All of these more recent investigators have esteemed the early studies of Hughlings Jackson much more highly than did the writers who preceded them. The tendency now is to use simpler classifications than formerly, Head differentiating four types of disorder of symbolic formulation and expression (verbal, syntactic, nominal and semantic), and Weisenburg using the terms "predominantly expressive", predominantly receptive", "expressive-receptive" and "amnesic" as descriptive of the four principal types of aphasic disorders.

As to localization of the lesions that cause aphasic disturbances, investigators are more conservative than formerly. Though there is general agreement (1) that, in the expressive group, the anterior part of the brain is the main site of the lesions with less involvement of the temporal and parietal regions; (2) that, in the receptive group, the involvement of the temporal and parietal areas is greater and that of the anterior brain less than in the expressive group, and (3) that, in the amnesic type, extensive areas may be destroyed by gliomata, even though symptomatically the chief difficulty may be that of the evoking of words as names for objects, conditions or qualities. It is now realized that in all aphasic disorders there are accompanying disturbances that point to disordered function of the brain as a whole. From now on progress must depend upon more exact clinical and psychological studies, on the one hand, and more precise pathological-histological controls, on the other.

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Case Reports

A CASE OF MENINGITIS DUE TO *B. PROTEUS*, WITH RECOVERY

BY JOHN C. CALHOUN, M.D., F.R.C.S.(C.),

Toronto

The object of this report is to place on record an example of a very rare form of meningitis, namely, that due to *B. proteus*. The patient fortunately recovered.

Miss B.H., aged 25 was admitted to hospital late in the evening of May 5, 1935, complaining of headache, earache, dizziness and vomiting, of one day's duration.

Immediate past history.—She had had an attack of "intestinal flu" one month previously, during which she vomited persistently for three or four days, was constipated, and felt dizzy. She was in bed for three weeks, but had been well subsequently.

Past illnesses.—She had had a chronic discharging left ear since childhood. Apart from this the only significant complaints were tuberculous glands (cervical) seven years previously and an appendix operation three years previously. She had evidently always had some trouble with constipation.

Examination.—On admission the right ear was negative. The left ear showed some thickening in Shrapnell's area; most of lower quadrants of the membrana tympani were missing; scanty but foul discharge; no external evidences of inflammation over the mastoid and only very slight tenderness on pressure over the antrum. There was complete deafness (noise apparatus) in the left ear. Bone conduction was lateralized to the right. The fistula test was negative. Spontaneous nystagmus both ways was noted, more marked on induction to right. Caloric test—no reaction on left side. There did not seem to be any clouding of the sensorium nor paresis of any of the cranial nerves. She was cooperative and, apart from the extreme nausea and vomiting, the only other suggestive feature was slight rigidity of the neck. A diagnosis of acute purulent labyrinthitis with possible onset of meningitis was made.

On the following day there were more definite evidences of meningitis. Neurological examination reported by Dr. H. Hyland was as follows.

"Examination shows the following positive signs—Patient cooperative and mentally clear, nystagmus on conjugate deviation to right, neck definitely stiff on flexion. Kernig's sign slightly positive. The patient staggers to right on walking, yet turns fairly well and does not fall on standing with feet together. Visual fields, fundi, coordination tests in bed, reflexes, tone, etc., all negative. At present time no definite evidence of cerebral involvement but patient may have a lateral sinus thrombosis or a commencing meningitis (strep. or pneumo.). Advise lumbar puncture and if fluid clear operation is indicated as soon as possible."

The lumbar puncture showed cloudy fluid; Pandy test reaction 2 plus; cell count 4,300 (mostly polymorphonuclears); jugular compression even. In spite of the spinal fluid findings, and chiefly because the mentality remained clear, we operated immediately. The mastoid process was dense and eburnated, of the non-cellular type, with a very deep-set small antrum, in the neighbourhood of which was found a small amount of pus under pressure, which gave a pure culture of *B. proteus*. There was no obvious lead from this small collection of pus anywhere. The sinus appeared normal and a large area of uncovered dura showed no gross evidence of meningitis. The posterior canal was skeletonized and the dura around the petrous bone more radically exposed than usual. The middle-ear portion of the operation was completed and the wound left wide open. No flap was cut but the original post-aural incision carried far forward over zygoma. This was done in order to pin the ear forward and allow maximum aeration. The only deviations from the ordinary procedures in after treatment were that (at the suggestion of Dr. P. Goldsmith) no packing was used and almost continuous irrigation with saline solution was instituted, and, secondly, that she had frequent spinal punctures daily for the first few days and gradually at increasing intervals.

After-course.—May 7th to May 9th, the patient was slightly better than holding her own, but still very nauseated, vomiting at times and drowsy. May 10th.—Definite improvement; spinal fluid clear and sterile. May 16th.—Improving rapidly; the temperature was approximately normal; she was able to flex her chin on the chest. From this point on until discharge from hospital on July 13th, convalescence was rapid and uneventful. She is now, (December, 1935) completely deaf in the left ear, but otherwise normal in every way. The cytology of the spinal fluid was interesting and corresponded precisely with her clinical improvement. After the first count of 4,300 there was a drop to 650 and the polymorphonuclears were being rapidly replaced by other white blood cells. The punctures were kept up at intervals until June 24th, the last count being 19 white blood cells. The first two reports showed *B. proteus* and then no growth.

The so-called "intestinal flu" a month prior to admission was probably a labyrinthine storm that she was lucky to survive. The normal habitat of the *B. proteus* is the intestine. This girl had evidently had considerable ill-defined intestinal distress, and I throw out the suggestion that the intestinal tract might possibly have been the original focus for this particular bacillus in the ear.

The literature on meningitis due to *B. proteus* is meagre. Neal and Abramson[1] made an extensive search and only 7 cases were discovered by them. One case in Constantinople, originally diagnosed as typhus fever, recovered; all the others (mostly aural) were fatal. They further say: "As a causative factor in meningitis the genus Proteus seems to be rare. In a series of nearly 2,000 cases of meningitis of various kinds seen by members of the meningeal division research laboratory Department of Health, New York City, it has been found only twice. In both these instances it was associated with other organisms." Kernan[2] reported two cases of septicæmia, one of which is included in the seven case reports referred to above. Gallagher[3] re-

ported a case of temporo-sphenoidal abscess with recovery. This case had a cell count of 450 but no organisms in the spinal fluid. Pavey-Smith and Miller[4] had a fatal case of lateral sinus thrombosis with generalized septicæmia due to *B. proteus*. Stein[5] reported three cases of septicæmia, one being from a secondary mastoid and the other two associated with tonsillectomy.

The records of the Toronto General Hospital, I believe, show one case of meningitis due to *B. proteus*, and it was fatal.

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A CASE OF RUPTURE OF THE SPLEEN

BY J. R. MULLOY, M.D., C.M.,

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A young man, twenty-two years of age, was admitted to the Cardston Hospital in July, 1935. He complained of passing blood in his urine, severe abdominal pain, faintness, nausea and vomiting.

He gave the history that in trying to catch a team of horses which was running away he ran into a stump, injuring the left side of his abdomen.

Examination showed a healthy, well-built young man, weighing about 180 lbs. There was some pallor, and the man looked extremely ill. A specimen of his urine showed it to be mixed with a good deal of blood. The abdomen on examination showed marked rigidity and tenderness along the whole left side, especially over the region of his bladder.

His condition pointed to a serious abdominal injury, and an exploratory operation was decided upon at once. With the maximum tenderness over the urinary bladder and the blood in the urine, it was decided to open the abdomen in the suprapubic region. When the abdomen was opened about a quart of free blood was found in the pelvis. This was sponged out, and in doing so a mass of tissue was found which proved to be the lower third of the spleen. The bladder was intact, and no break in the peritoneum covering the kidney was found.

The wound was closed and a left rectus incision was made in the left hypogastric area. The spleen was normal, except that the lower third was torn away. There was a constant ooze from this lacerated margin. The whole lower edge of the organ was sutured with mattress sutures with great difficulty. A small drain was put down to the raw area and the abdomen was closed. The young man made an uneventful recovery.

This case is interesting in that we have here in the same patient a damaged kidney and a lacerated spleen. It is of further interest in that this man had to come forty miles for treatment, and that he did not succumb to hæmorrhage on the way.

CHLORAMINE ALLERGY.—E. B. Salén states that in Sweden preparations of chloramine have recently come into common use as domestic disinfectants; they have been proposed for food preservation, and are much used in veterinary practice. In connection with the last sphere of usefulness he encountered what he believes to be the first recorded case of hypersensitiveness to the drug. A veterinary student, from the time of coming into contact with the powder from which chloramine solution was freshly prepared, suffered from naso-pharyngeal catarrh followed by erythema, urticaria, and angioneurotic œdema. An acute and alarming attack of asthma followed his treating a scratch by chloramine applications. Hypersensitivity to this substance was then proved by intracutaneous test injections, and by transference of his serum to other subjects. Desensitization by increasing injections of minimal amounts of chloramine in combination with adjuvant treatments removed the allergy. A latent sensitivity to chloramine was found by cutaneous tests in ten of twenty-nine veterinary surgeons. In four of them it seemed certain, and in four probable, that allergic manifestations from which they suffered were due to contact with chloramine.—*Acta Med. Scand.*, 1935, v-vi, 486. Abs. in *Brit. M. J.*

Editorial

CHRONIC POISONING WITH CARBON MONOXIDE

CARBON monoxide as a menace to life and health is gaining importance steadily as time goes on. The reason for this is, in the main, the increasing use of the internal combustion engine. Gasoline motors, the automobile, the aeroplane come specially into thought here, of course, but faulty gas-ranges and the imperfect combustion of coal are also important. The practice of smoking also should be mentioned.

Acute carbon monoxide poisoning is very well understood. Its immediate manifestations and its sequelæ are so obtrusive that they have demanded and have obtained much attention. It is somewhat different with chronic poisoning. The situation here is more elusive. The signs and symptoms are not striking and must be looked for, and the factors involved are many and variable. While it is possible, and even likely, that certain forms of ill-health should be attributed to exposure to small doses of carbon monoxide over prolonged periods of time we seem to have gained merely impressions and few concrete facts. We therefore welcome a study of the subject by Dr. Paul Michael[1] (a graduate of McGill University, by the way), in which he gives us the results of his own experiments and observations. His paper is a valuable contribution to the elucidation of an important and difficult problem.

Chronic poisoning with carbon monoxide seems to have been first mentioned by Moreau in 1869 (quoted by Lewin[2]) who termed it "the insanity of cooks" and ascribed it to working over badly ventilated stoves. Since that time some interest has been taken in the subject, particularly by Henderson and Haggard[3], Alice Hamilton[4], Armstrong[5], and Jones.[6]

Carbon monoxide is not a true poison but acts by diminishing the oxygen-carrying capacity of the red blood corpuscles. Its affinity for hæmoglobin is three hundred times greater than that of oxygen, so that it easily replaces that element after a brief exposure. Michael states that cerebral symptoms occur when one-fifth of the hæmoglobin is taken up, while death may be expected if two-thirds is unavailable.

In considering the hazard from carbon monoxide which the ordinary man who is living an ordinary life undergoes we may deal first with the question of smoking. Jones (*loc. cit.*) and Armstrong (*loc. cit.*) have found that the incomplete combustion of tobacco leads to the production of carbon monoxide. Michael gives the following figures from his own observations. In an unventilated room, 8 by 10 by 12 feet, one person may, by continuous smoking, develop rather high concentrations of the gas in his blood. Taking cigarettes, pipes, and cigars, in the order given, the following figures were obtained: at the end of one hour, 0.5, 0.5 and 1.1 parts of carbon monoxide in 10,000 parts of air, with a blood saturation of 0; at the end of two hours, 2.0, 2.5 and 2.9, with a blood saturation of 2.3, 4.0 and 5.0 per cent; at the end of three and one-half hours, 4.0, 4.5, and 6, with a blood saturation of 5.0, 6.5, and 10 per cent. However, these figures would be excessive for the average smoking room where there is ventilation. Whether the amount of carbon monoxide introduced into the blood through smoking is harmful is hard to say. Doubtless, the danger would be greater if the smoke is inhaled.

Michael studied 100 garage workers and obtained positive blood findings in 15. At the worst time of the day for these men the percentage of saturation ranged from 8 to 12.

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Most of these men were underweight, were pale and sallow, and complained of lassitude and vague gastro-intestinal symptoms.

The hazard from carbon monoxide inherent in street traffic is hard to assess. Those who are specially liable to trouble are not the ordinary pedestrians but those who are compelled to spend a large proportion of their waking hours in the street, particularly when they are for periods of time stationary at street corners and stopping places, such as traffic policemen, taxi drivers, street cleaners and newsdealers. Michael has followed for great lengths of time in the wake of large buses and has found that when they stop at intersections the surrounding air takes on a definitely high concentration of carbon monoxide, even if this be but temporary. As the sellers of newspapers are usually located at these intersections many were examined for carbon monoxide. At the height of the evening traffic 12 of 25 persons examined showed blood saturations of from 2 to 4 per cent. Probably here is a potential danger if the exposure were to be continued over many years.

On ferry boats, where many automobiles may be carried and their engines will be running for short periods, the hazard seems to be negligible. The same thing may be said in connection with aeroplanes, at least, those of the latest type.

Michael gives some interesting facts in regard to the contamination of the air in the Posey Vehicular Tube, a common thoroughfare running under the Oakland estuary between Oakland and Alameda, California. In this tube as much as 240,000 cubic feet of carbon monoxide are discharged in one hour. The ventilating system, however, has been so efficient that the content of gas has been maintained at or below 2 parts per 10,000 parts of air. Despite these low figures, however, several of the maintenance men developed a train of symptoms which led to the institution of a medical survey. The men in question complained of frequent temporal headaches, dyspnœa, slight palpitation on exertion, weakness, anorexia and nervousness. Objectively, they exhibited loss of weight, pallor, hypotension, conjunctivitis, congestion of the retinal vessels with bright red blood, pulmonary congestion, and, occasionally, tremor of the hands. There were also polycythæmia, with red cell counts as high as 6,000,000, glycosuria occasionally, a slight shift of the blood towards the alkaline side, with a carbon dioxide combining power of 58 to 65. Concentrations of carbon monoxide in the blood of from 5 to 10 per cent were found. Clearly, in the case of obscure illnesses, particularly if not of a clean-cut character, the question of chronic carbon monoxide poisoning should be considered, at least in the case of those persons who for any reason may be suspected of being exposed more than others to that particular hazard.

A.G.N.

THE PROTECTION OF NURSES AGAINST TUBERCULOSIS

IT would be difficult to say just when tuberculosis first became generally recognized as an infectious disease, but we would probably be safe in saying that the realization of this truth was only gradual; and even then it took some time before much was done about it. It is rather curious that one of the last things to be recognized has been the serious menace of tuberculosis to our nursing profession. This is well brought out in the last report of the Committee on Research of the Canadian Hospital Council.* The Committee is convinced that "up until a few years ago nurses, particularly in general hospitals, undoubtedly were not given the protection against this infection that they were entitled to". The actual incidence of tuberculosis amongst nurses, however, has been difficult to determine. Two years ago an interim report of the Committee presented most alarming findings. These have been modified to some extent, but only so far as to say that the disease amongst nurses is not so general as was thought but is more local in nature. Estimations of its incidence show such wide variation that until more information is gained it will be impossible to make definite assertions, beyond saying that

*Bulletin No. 18 of the Canadian Hospital Council, 1935.

in many hospitals, particularly general hospitals, the incidence is far greater than it should be.

This report comments on the increased interest being shown in the matter. The Province of Alberta, for example, passed an Order-in-Council in January, 1935, enacting that,

> "The Hospital Board shall see that every nurse in training, every attendant and every new graduate nurse taken on the staff is given a complete physical examination including an x-ray examination of the chest before ....(being)....accepted or placed on duty. In the case of the nurse in training and the attendant a complete physical examination including an x-ray examination of the chest shall be made at least once every twelve months throughout the period of training."

And in July, 1935, the Ontario Department of Health ordered that every nurse in a sanatorium or general hospital should receive a tuberculin test within a month of entering service, an x-ray to be taken of the chest when the test was positive.

The weak point in our defence lies in the general hospitals rather than in the sanatoria, where the strict technique and frequent examinations of nurses reduce the risk to the minimum. What figures we have show that undoubtedly there is a lower incidence of tuberculosis amongst nurses in sanatoria than in general hospitals. The general hospital, of course, has much more difficulty in protecting the nurse, especially on the surgical side. It is quite possible for a patient with an active pulmonary lesion to be admitted with, let us say, a fractured femur, and to be nursed for some weeks before his tuberculosis is recognized. Even a careful physical examination is not enough to rule out tuberculosis. Many active lesions can only be detected by the x-ray. Constant sputum examinations are most valuable, but would be a heavy addition to the routine work of a busy surgical ward. Such obscure cases do not occur often. Do they justify a routine x-ray examination of every admission to the hospital?

As regards the nurse herself, there is probably no good training school which does not now insist on preliminary examinations of applicants, including x-rays of the lungs and tuberculin-testing at regular intervals. The Committee's recommendations on this and many other points regarding protection of hospitals' staffs against tuberculosis deserve the serious attention of the profession.

H. E. M.

Editorial Comments

The Health Insurance Bill in British Columbia

We reproduce in full on page 685 an editorial from the *Bulletin of the Vancouver Medical Association* (May, 1936), which sets forth the views of the medical profession in British Columbia regarding the Health Insurance Bill recently passed by the Provincial Legislature. We feel that the profession in Canada generally should be shown something of the difficulties which are being faced by their brethren on the Coast. Not only that; we feel that all of us have a good deal to learn from the way in which these difficulties are being faced. The legislation at first proposed in the draft bill of March, 1935, might, with certain modifications have been satisfactory, but the legislation, in its present form, involves injustice to the doctors, and will lead inevitably to hardship and inadequate medical service for the people. And yet, we think it will be agreed that the tone of this statement of the doctors' side is a model of dignity, of fairness, and of clear, firm thinking.

A letter has been sent to the members of the profession in British Columbia by their Health Insurance Committee advising strongly that there be no definite stand as to working under the Act, until it is known exactly what the Government will suggest regarding the services to be rendered and the remuneration to be offered. It is understood that no medical man can be compelled to provide service under the Act against his wishes.

It is needless to add how sincerely we wish our fellow practitioners a happy issue out of their afflictions, and how strongly we support their resolute stand for a fair deal for both doctor *and* patient. H.E.M.

The Late William Blair-Bell, M.D., F.R.C.S.

The death of William Blair-Bell occurred suddenly in a train on January 25, 1936. By his death the profession has lost a distinguished and inspiring leader. A judicious combination of the investigating type of mind with an admirable clinical sense brought him to a leading position in his specialty, that of obstetrics and gynæcology.

Dr. Blair-Bell was born at Wallasey, England, in 1871, the son of the late Dr. William Bell,

J.P. and of Helen, daughter of the late General Butcher. He was educated at Rossall School, King's College and King's College Hospital, London. He obtained the Conjoint Diplomas in 1896, the M.B.,Lond. in 1897, the M.D. in 1902, and the B.S. in 1904. He was elected a Fellow of King's College in 1928.

His special distinction may be said to have begun when he published some papers on physiology and clinical gynæcology which were well received, and he was, in 1905, appointed gyæcological surgeon, with the care of out-patients, in the Liverpool Royal Infirmary, and gynæcologist to the Wallasey Cottage Hospital. From the start he adopted the laboratory-ward system, correlating research and clinical observations, much as Osler did at Johns Hopkins. His studies and interest led him to investigate the physiology of sex in a degree that had never been done before. In his Arris and Gale Lectures (1913) on "The Genital Functions of the Ductless Glands in the Female" he advanced the thesis, probably for the first time, that the functions of reproduction are controlled by the action and reaction of all the organs of internal secretion rather than by the gonads alone, as had usually been thought. His book, *The Sex Complex,* (1916), brought together and amplified his former observations. In 1919 he brought out an extensive monograph, *The Pituitary,* which won for him the John Hunter Medal and the Triennial Prize of the Royal College of Surgeons, and the Astley Cooper Prize for original work on the same subject. Blair-Bell was the first to draw attention to the value of pituitrin in obstetrics, based upon his satisfactory experience with this substance in the treatment of three cases of post-partum hæmorrhage. In 1910 his textbook, *The Principles of Gynæcology,* appeared, a work conceived along new lines, which at first was looked at askance but eventually was widely accepted.

In 1913 Blair-Bell became Senior Surgeon to the Liverpool Royal Infirmary, and in 1921, Professor of Obstetrics and Gynæcology in the University of Liverpool, the latter, a position which he held until 1931, when he retired with the title of Emeritus-Professor.

Perhaps more than all that has been mentioned Blair-Bell's fame, at least in other countries than his own, was attributable to his notable studies on the treatment of cancer by means of lead. This work was begun in 1909 and was based on the hypothesis that chorionic epithelium, and particularly the syncytium, was normally a malignant tissue, having the vegetative qualities and the invasive power of cancerous growths. Realizing that lead was being used as an abortifacient, when it appeared to exert toxic activity on young embryonic cells, he was led to the conception that it might possibly restrain the growth of tumour cells. In 1920 he treated an inoperable medullary carcinoma of the breast with a partly colloidal lead iodide injected intravenously. Within a month the primary growth had practically disappeared and the enlarged glands had diminished. Other encouraging results were obtained and the work was later assisted by a Cancer Research Committee founded by the University of Liverpool in 1923. By 1930 more than sixty papers by Blair-Bell and his associates on the subject of lead and cancer had appeared. These researches were assembled by him in 1930, in *Some Medical Aspects of the Cancer Problem.* In this intricate matter the author gave evidence of that caution and fairness of mind which had always characterized him.

Blair-Bell was chosen to be the first president of the British College of Obstetricians and Gynæcologists on its formation in 1929, and was a member of numerous learned societies concerned with his specialty, both at home and abroad. He was elected a Fellow of the Royal College of Surgeons of England and a Fellow of the American College of Surgeons. He was an honorary LL.D. of Glasgow and Liverpool. He was a Commander of the Royal Order of the Star of Roumania. Altogether, a conspicuous figure, whose work has had and will have far-reaching results. A.G.N.

"State Medicine"

A delusion held by many voters is that state medicine means free medicine. Anyone who opposes the rapid and immediate introduction of state medicine is regarded as a sort of monster who really wants people to be sick, or who grudges sick people proper care. The Saskatchewan Minister of Health in discussing state medicine has asked, "Who is going to pay for it?" The usual answer is, "The taxpayers". But the taxpayers of Saskatchewan are already more than forty million dollars behind with their payments. So the Minister of Health spoke out and said, "This is not the time for state medicine", thus marking a new departure in political speeches. It is an exhibition of adult mentality which is a refreshing change from childish hopes that the state will take more and more responsibility from the individual without knowing or without caring where the burden ultimately falls. It is an attitude which may not win votes from the masses but will be appreciated by those who have the old-fashioned notion that a debt is an obligation to be met. LILLIAN A. CHASE

Dr. Edward W. Archibald

The members of our Association and the many friends of Dr. E. W. Archibald, of Montreal, will rejoice in hearing of the new honour that has come to him. On April 22nd he was awarded the Trudeau Medal of the National Tuberculosis

Association at its meeting in New Orleans. This award is conferred annually on "that individual who in the judgment of the Association has made the most meritorious contribution on the cause, prevention or treatment of tuberculosis." Doctor Archibald was selected because his work led to the introduction of the operation of thoracoplasty in America. His first operation of the kind was performed in 1912.

Doctor Archibald has received other titular distinctions. He was the first Canadian surgeon to be elected an Honorary Fellow of the New York Academy of Medicine; he is an Honorary Fellow of the Royal College of Surgeons of England; and last year he was made an Honorary Fellow of the Royal College of Surgeons of Australasia; he is also a Fellow of the American College of Surgeons and of the Royal College of Surgeons of Canada. Doubtless there are some others that should be noted! All will agree that these various distinctions have been well won and are gracefully borne. A.G.N.

Dr. D. E. Robertson

The *Journal* desires to join with the other friends of Dr. D. E. Robertson, and on behalf of the members of our Association, in expressing to him our sincere gratification that he has escaped the grave peril to which he was recently exposed in the Moose River Mine. Only a man of steadfast courage, of resourcefulness, and sound physique could have come through the ordeal as he did. We rejoice with him. To Mr. Scadding also we extend our greetings. We trust that neither of these gentlemen will be eventually the worse for their terrible experience. A.G.N.

Medical Economics

The Health Insurance Bill of British Columbia:

An Editorial in the *Bulletin of the Vancouver Medical Association*, May, 1936

"We publish herewith a copy of the Health Insurance Bill,* which, after suffering many things, like Ulysses, has at last been passed at the recent sitting of the Legislature. There has been some criticism directed at the medical profession over this Bill, and it would be idle to deny the fact; but we do not think the criticism is necessarily well-founded.

"We have been criticized for opposing the Bill. Well, we admit that freely. The original draft Bill was not in any way perfect; in many ways it was bad; but it was a long way better than this one. It *did* purport to look after *all* the members of the community whose yearly income, whether from indigence or low wages, fell below a certain level. It *did* acknowledge the fact that the Government should contribute to the Act, by at least half the lost of administration. It *did* acknowledge the medical profession. It seemed to recognize the fact that medical men will be necessary in the working of this Act, and it gave us a certain amount of say in the administration of the Act. It *did* make some attempt to ensure that the income obtained from assessments, etc., would more nearly meet the necessary outgoings.

"But gradually, under the pressure, not of clearer knowledge and riper judgment, but of political necessity, this Bill was pruned and shorn of these characters—till after a battle, never equalled, as we believe, in these parts at least, the Bill has emerged, a sorry enough spectacle. For it is a pale shadow of its former self, anæmic and paralyzed in its lower limbs, or lower income-levels, if you prefer. It no longer makes a pretence at humanitarianism, which we were led to believe was the main impulse animating its progenitors. The indigent, the domestic servant, the casual labourer, the part-time worker, those in receipt of old-age and mothers' pensions, in fact all the people who really need medical aid the most, and cannot afford it at all, are or may be excluded. The Government's contribution is removed. The contributions from those who do pay are not sufficient, on any calculation, to give what we would consider to be an adequate medical service.

"We have been criticized, as a profession, for opposing this Bill, because it has been said of us that our reason for opposing it is that our remuneration is too low. It is quite true that this is one of our reasons—and there is nothing criminal in trying to get adequate pay for the work expected of us. The amount originally set aside for this purpose would mean economic slavery for the majority of medical men, and we do feel that we have a right to oppose this. The upper limit has been removed, and there may be now some room to bargain—but even so, this is not our main reason for objecting to this Bill.

"Our main reason is that we know that this Bill will not give what was promised to those who come under it, namely, a complete and adequate medical service. Those who think it will are due for a major disappointment. No

* This refers to the issue for May, 1936, of the *Bulletin of the Vancouver Medical Association*, in which the Health Insurance Bill is printed in full. Those specially interested in the details of the subject can obtain this information from the Secretary of the Vancouver Medical Association. [ED.].

partial Health Insurance Bill, such as is this, or those in effect in England and Germany, has ever given, or will ever give, a good service. It is true that this Bill promises specialist service, but it does not provide funds to give it, and it is governed by two pernicious principles. The first is that if enough money is not obtainable medical benefits will be reduced; the second is that if there is not enough money to pay adequately for all the service given a reduced rate of pay must be accepted. We confess that we cannot remember ever having heard of a contract of any sort or description being signed on these terms.

"We have been criticized as a profession for not giving our views to the public before this, while radio, press, pulpit, and university classroom have been freely conscripted and used without stint for purposes of propagation of the new gospel. Our reasons for this are old-fashioned, but we believe good ones, notwithstanding. We wanted to play fair. We might long ago have expressed ourselves—but there was no definite statement, only "memoranda", and we did not feel that we were right in attacking anyone on suspicion, or through mistrust of their motives, until definite legislation was brought down. But we think as medical men we are justified in pointing out to those who may, as many of our friends still do, ask our opinion of this legislation. We may rightly warn them of the following dangers as we see them; the following defects in this Bill:

"First, the danger to industry—the economic threat of this Bill, provincial in scope, applied at a time when industry is gasping for life, and has to compete with stronger, more established industry elsewhere.

"The danger, almost the certainty, that the assessments will not be enough, and will very soon have to be raised. This is the history of all such social legislation. Workmen's Compensation Acts, Old Age Pensions, Mothers' Pensions, Social Service—all these cost more and more as the years go by—and we are sure this will be no exception.

"The danger of poor, hurried, inadequate medical service and the lowering of medical standards of practice. Anyone who knows anything about panel practice in Great Britain knows that its standard is deplorably low—and we fear that the tendency under this Bill will be in the same direction. Certainly, under a capitation system of payment, there would be grave danger of this.

"The absence of any preventive measures designed to lessen disease.

"The exclusion of the indigent and those whose income is uncertain and very small. This is one of the worst defects of this Bill.

"The inadequacy of hospital arrangements. This has been consistently ignored, though hospital authorities have been most definite in their warnings.

"We have been accused of opposition to health insurance. This is not true. We are unanimously in favour of health insurance, and that is why we do not like this legislation. We foresee nothing but disillusionment and disappointment over this Bill, which, we were told, was to be so far in advance of all such legislation—and, in the last analysis, has turned out to be no better than the average old-time legislation.

"In its study for many years of Health Insurance the medical profession has gradually formulated a series of principles which it believes should govern any Health Insurance scheme. The basic object of these principles is to safeguard both our own interests and those of the public who would benefit under the Act, and we believe that both these things are essential. Thus we believe that the indigent should be included and those of very small income; that prevention should be a major feature in this type of legislation; that doctors should be paid for services rendered, and not according to a capitation fee and so on. We have not seen any reason to change our minds in these matters—and believe that if the public demands and is to obtain adequate, modern, and scientific medical service these principles must still be maintained.

"Lastly, we feel we must say a word about the work of Dr. W. H. Sutherland, M.L.A., in regard to this Bill, as it passed through Committee. His attitude has been worthy of the highest praise. He showed firmness and dignity, a due sense of the amenities, and a true respect both for the House and for the profession he represented. In the record as we have seen it, he refused steadily to yield to expediency, or to sacrifice his principles, and we congratulate him sincerely on his conduct in a very trying situation."

A Letter to All Members of the Medical Profession in British Columbia

Dear Doctor:

In this issue of the *Bulletin* you will find a verbatim copy of the Health Insurance Act as passed by the Provincial Legislature on March 31, 1936.

The Health Insurance Committee has been delayed in reporting to the members of the medical profession by various causes: the first being that it was felt desirable that every medical man should have a copy of the Act to study for himself. This is our reason for printing this Act *in extenso;* as it would have been extremely difficult to obtain the six or seven hundred copies necessary in any other way.

We ask that everyone study this Act carefully, and note the following:

It will not come into effect until it is proclaimed by the Lieutenant-Governor-in-Council, and probably this will be done in sections: the first section dealing with the appointment of a Commission to set up machinery, draft regulations, arrange methods of payment with doctors, hospitals, etc., and determine forms of treatment for those benefiting under the scheme.

The Commission has been given wide powers both as to the extent and nature of the benefits to be given and the amount of remuneration to be paid.

It is our definite understanding, both from statements of the Hon. G. M. Weir in Committee and from legal opinion, that no medical man can be compelled to provide service under this Act unless he so desires. If he agrees to do so, he is subject to regulation, but until and unless he so agrees he is a free agent.

The Committee is strongly of the opinion that it would be unwise for the profession to take any definite stand as to working under this Act until the regulations have been made known, and until we know what the Government will suggest with regard to the services to be rendered, and the remuneration that will be offered. When these are known, the Committee will study them carefully, and will be prepared to make definite recommendations to the profession. No action of any sort will be taken by the Committee without the full knowledge and endorsement of the profession throughout the Province, through the Council, and through accredited representatives of the various sections.

In the meantime, the Committee wishes to take this opportunity of thanking the medical men for their loyalty and unqualified support during the difficult year that has just passed. It realizes the strain and anxiety that have been felt by all medical men, and it has been conscious of this, and has been doing its best to conserve the interests of the profession. It has received pledges of support, and assurances of united action from every district. Direct canvass of every man has shown almost complete unanimity, and it is of the greatest possible importance that this should continue to be the case. Especially during the next few months will our solidarity be tested, and it must not fail. Sooner or later we shall be called on for decision, and we must act as a united body.

The upper limit of money available to pay doctors has been removed, and this, in the opinion of the Committee, renders the Bill somewhat more elastic, and makes negotiations possible.

We believe that there is still room for negotiation, and that terms satisfactory to both parties can be arranged—but this can only be secured if we act as a unit.

Independent action on the part of any medical man can only lead to disaster for himself as well as for all the members of the profession; and we most earnestly ask any medical man who may be approached with a view to action under this Act to refer to the Committee at once. We must make it clear that we are acting as members of a united profession, not individually.

A study of the Act, and especially of the comments on it in a separate column will, we believe, convince any man that unity is most urgently necessary if our standards of practice and living are to be maintained, and if adequate medical service is to be secured for the beneficiaries under this Act.

There will, at a very early date, be opportunities given for the freest possible discussion of this bill and of our future policy. Open meetings, whether luncheon meetings or afternoon meetings, will be arranged; speakers familiar with the Act will lead the discussions, and everyone will be given an opportunity to express his views, to ask questions, and to contribute suggestions.

In the meantime, your committee has closely reviewed the Act, and is ready, as soon as opportunity offers, to indicate clearly and definitely to the profession what line it thinks should be followed. This will, of course, depend upon the suggestions and proposals that will be made to us by the Commission, and every effort will be made to obtain an amicable and satisfactory understanding, on terms that are fair and equitable to all.

W. E. AINLEY, *Chairman.*

THE NIELSEN METHOD OF RESUSCITATION.—A new method of resuscitation, increasing the safeguard on beaches and other bathing places as well as in many industries, has been developed by Holger Nielsen, a Danish sports director and is described in the *New York Times.* Taking the well-known Schaeffer method to represent 100 per cent efficiency a board of representatives of the Danish Red Cross and Life Saving Organizations gave the Nielsen technique 141 per cent and unqualified endorsement. With the Nielsen method the operator kneels at the head of the patient, instead of astride his hips, puts pressure on the shoulder blades instead of lower down on the rib structure, and at the conclusion of each pressure permits his hands to slide to the patient's arms and raises them very slightly. By this small action, seemingly inconsequent, the operator removes the weight of the patient's torso from his chest and makes it expand so greatly as to cause the lungs to accept almost double the quantity of air that can be taken under any other method. This slight lift lessens the number of forced respirations to the minute, but causes an increase in the depth of each breath of a full 90 per cent over the Schaeffer method.

Men and Books

THE TENDON OF ACHILLES

By J. Harold Couch,

Department of Surgery, Toronto General Hospital,

Toronto

Neither the classical testimony bearing on the vulnerability of the heel of Achilles nor the adoption of the name, *tendo Achillis,* into surgical terminology are as old as might at first be supposed. The Homeric poems allude in no way to the story of Achilles' heel, which is in fact only one of many later accretions to the Achilles legend and is most specifically treated by two late Roman writers, Fulgentius (*Mythol.* III, 7) and Statius (*Achill.* I, 269).

The story in brief runs somewhat to this effect.[1] Thetis, the divine sea-nymph, mother of Achilles, was destined by fate to bear a son who should exceed his father in power. The tardy discovery of this oracle caused Zeus, the king of Heaven, discreetly, to abandon his intention of marrying Thetis. He remembered too well the manner in which the last two kings of the gods, his grandfather Uranos and his father Kronos, had each in turn been overcome by his own son, and he had no wish to invite such a disaster upon himself. Thetis was left, therefore, to become the wife of the mortal Peleus, and their son Achilles, in fulfillment of his destiny, quickly eclipsed the prowess of his mediocre father. Thetis sought to confer immortality on her son by immersing him in the waters of the River Styx. Unfortunately, she held him by the ankles or an ankle, and this part of his body was not rendered invulnerable. According to another version of the story Thetis sought to test the divinity of her new-born son, whose parentage was half-human, half-divine, by dipping him in boiling water. She discovered that he was completely immortal, except for the ankles.

It was from this legend that Philip Verheyen, Professor of Anatomy at the University of Louvain, first adopted in 1693 the anatomical term *chorda Achillis,* which was soon changed by Heister (*Compendium Anatomicum*, No. 174) to *Tendo Achillis*, or, in its anglicized form, "tendon of Achilles", to designate the powerful end tendon of the gastrocnemius and soleus muscles. Hyrtl[2] records Verheyen's adoption of the term and discusses briefly the history of the literature on the subject.

It will be observed that the legend, as we know it, refers not to the strength of the heel of Achilles but to its weakness, whence vulnerability of any sort is figuratively referred to as an "Achilles' heel". On the other hand, the tendon of Achilles is in point of fact a particularly powerful one—"*Tendo Achillis omnium fortissimus* (Heister)." However, the name was thought appropriate because for many centuries wounds or bruises of the *tendo Achillis* were believed to be exceedingly serious. Hippocrates, who used a plural term (*neura megala*) for the tendon of Achilles, because several muscles are involved, says: "This tendon, if bruised or cut, causes the most acute fevers, induces choking (if not the death-rattle), deranges the mind, and at length brings death." Galen (*Comment.* II, Hipp. *Fractures* 17) remarks: "The bone of the heel is joined by nerves, which Hippocrates says are ἐπιχαιρίοι." Hippocrates used the term ἐπιχαιρίος for dangerous or deadly wounds of the body. This tradition regarding the very sensitive nature of the *tendo Achillis* was strong enough to delay the introduction of tenotomy into the practice of surgery until comparatively recent times.

There is one other explanation of the name which is of interest only for antiquarian reasons. The verses of Homer (*Il.* XXII, 396 f) have been invoked, in which Achilles, about to drag the slain Hector behind his chariot, "pierced the tendons of both feet behind, from the heel to the ankle, and he pushed through ox-hide thongs and bound him from the chariot, and allowed his head to be dragged behind." This passage indicates that Homer knew the anatomical nature of the tendon, which is by no means surprising, but, as Hyrtl points out, if it had anything to do with the origin of the name, then it should be called the *tendo Hectoris,* and not the *tendo Achillis,* since the procedure was performed on the feet of Hector. It is, however, clear, from the writings of both Hippocrates and Galen, that the ancient Greeks did not think of the tendon of the heel in connection with Achilles at all. The introduction of the term into surgical literature is undoubtedly due to the classical education and the poetic imagination of the Professor of Surgery at Louvain.

I wish to acknowledge, in the preparation of this paper the assistance of my brother, Professor Herbert N. Couch of the Department of Classics, Brown University, Providence, R.I.

References

1. For a full account with references see Roscher: *Ausführliches Lexikon der Griech. und Rom. Myth.*, s.v. Achilles, II, *a.* Geburt und fruheste Jugend, pp. 23-26.
2. Hyrtl: Onomatologia Anatomica, Wilhelm Bräumuller, Vienna, 1880, p. 531.

Association Notes

The Annual Meeting

A MESSAGE FROM THE PRESIDENT-ELECT

Victoria, the far western outpost of the British Empire in Canada, will entertain the Canadian Medical Association at its Annual Session this month. The Association met here in 1926 and it is hoped this year's meeting will be as well attended as that of ten years ago.

This beautiful city, if running true to form, should welcome the visitors with summer weather, glorious sunshine, moonlight nights—in fact an ideal place for one to indulge in golf, swimming, riding, tennis, fishing, etc. Many beautiful gardens will be open for inspection, and of these Mr. and Mrs. R. P. Butchart's sunken gardens enjoy a world-wide reputation. For those who prefer a quiet time, the Empress Hotel and its picturesque gardens afford every comfort and pleasure. The Crystal Gardens and swimming-pool of sea-water will appeal to the imagination of visitors from inland places.

For the entertainment of our visitors the local Committees of physicians and their wives have arranged elaborate programs, taking the form of receptions, luncheons, cabarets, golf tournaments; visits to point of interest such as the Quarantine Station and the Dominion Astrophysical Observatory.

The scientific part of the meeting approaches the usual high standard attained in former years, as a reference to the list of speakers will substantiate. The names of those who have achieved international fame in clinical and laboratory investigation and discovery will be found in this list, and, we hope, will act as a magnetic attraction to the profession of our country and that of our cousins to the south.

The medical men of Victoria extend a hearty invitation to the Candian Medical Association, and hope that after the Convention is finished all will be agreed that the mental food and relaxation provided have added to an abiding interest in and love for our profession.

HERMANN W. ROBERTSON

Victoria: This Year's Convention City

From 22nd to 26th of this coming June Victoria, the Capital City of Canada's most western province will be the scene of this year's Convention of the Canadian Medical Association.

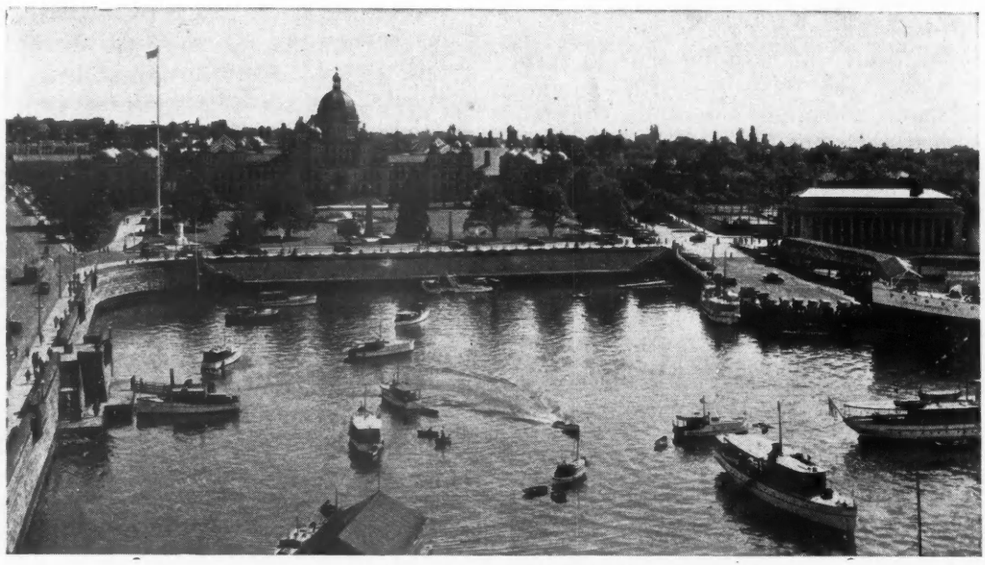
The city's growing popularity as a Convention centre is well merited. Victoria is built in an exceptionally beautiful natural setting. It is bounded by the sea on three sides and on the fourth stretches out into a countryside of small farms and homes, these merging further afield into the famous evergreen forests of Vancouver Island. Hotel accommodation is good, ample, and the rates are reasonable, while golf, fishing — fresh and salt water — yachting, motoring along winding country roads, and bathing can all be enjoyed within a few minutes' drive of the heart of the City. Full particulars and directions concerning all of these are given in the Association's Convention program.

A city, like an individual, has to make up its mind as to what trade or profession it is going to follow as its main means of livelihood. Up to the present Victoria has, apparently, not been able to come to a final decision. Where else will you find a city which is essentially residential but which is also a world port, to which ships from all the seven seas come on their lawful occasions, and a growing and natural summer holiday resort! a far western city, but with a distinctly old country atmosphere; a city known throughout the world as very English, and yet which boasts the largest Burns Club in the world, not excluding Scotland itself; a city of a hundred contrasts and as many paradoxes; a city that has stubbornly refused to be standardized and persists in being itself and leading its own distinctive life.

In no particular is this difference more marked than when one considers Victoria's climate. The average summer day temperature is 61° Fahr., winter 42° Fahr., and rainfall less than 27 inches, over 16 inches of which falls during the winter months. The average annual sunshine is nearly six hours daily throughout the year. Victoria, in short, has no extremes of climate, no sand or dust storms, no blizzards, no earthquakes, no zero weather, and also no venomous snakes or other reptiles, and no deadly insects. This mild, all-the-year round, climate is the reason why so many people come to reside in the City under doctors' orders.

It was the British who discovered the island now known as Vancouver, on which Victoria stands, and stamped it for their own. Sir Francis Drake, in 1579, looked up the coast from California and in the lordly manner of those spacious times claimed all the territory to the north on the Pacific Coast for Queen Elizabeth, under the name of New Albion. Captain James Cook visited Nootka on the west coast of Vancouver Island whilst sailing around the world in 1778, and Captain George Vancouver circumnavigated the island in 1792, being, incidentally, the first man to so do, and annexed it to Great Britain. It is true that some Spaniards had

sailed as far north and even planted a settlement at Nootka, but Spain did not make any great efforts to retain the island. After the departure of Captain Vancouver in 1792, except for the occasional visits of fur traders, the island was left in the possession of its native Indians until 1843, when the Hudson's Bay Company decided to move their fort from the State of Washington, which was then being transferred to American ownership, to British Columbia, and chose the site of the present city of Victoria, naming their fort after the great British Queen.



Part of the Inner Harbour, showing the Parliament Buildings

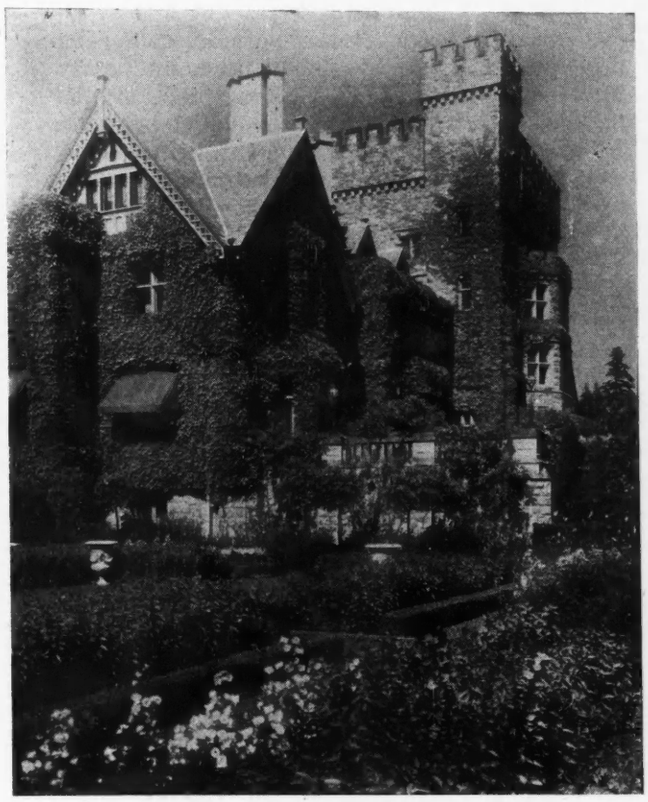
Since that date succeeding waves of migration have swept up to Victoria — from the gold-fields of California to the gold-fields of the Cariboo; from Eastern Canada and the Canadian Prairie Provinces; from Great Britain, and from the European Settlements in the Orient. Of course, the waves receded, but in every instances they left a number of new residents. Many of these people naturally enough tried to change Victoria into a semblance of the cities they had come from. They did not succeed, but, on the other hand, Victoria did change them into Victorians. The man you stop to chat with on the cliffs in Beacon Hill Park, while looking at the royal swans in Elk Lake, admiring the luscious foliage resplendent with flowers in Mr. R. P. Butchart's sunken gardens, examining the old charts of the pioneers and discoverers in the Provincial Parliament Buildings, catching a forty-pound spring salmon in Brentwood Bay, playing golf in view of the snow-capped Olympic Mountains, fishing for steelhead in the swift Island rivers or for giant salmon in the bays and estuaries, browsing for rare volumes and antiques in the curiosity shops so reminiscent of Charles Dickens — the man, I say, that you speak to, thinking he is a native-born Islander, you will most probably find came to Victoria from the Highlands of Scotland, or the shires of England, the blue-ridged mountains of Virginia, the coast of Maine, or the valley of the St. Lawrence. Victoria is, in short, at one and the same time one of the most insular and most cosmopolitan cities of its size on the North American continent. Yet it is essentially British. The winding streets, the houses that are homes, the walled-in, sheltered gardens, the tree-shaded country lanes where the motor car is never seen nor its noise heard, the tweeds and cheviots and good leather brogues and boots; the stiff-necked British race have not allowed climate to change their characteristics in any essential way. Or, perhaps we ought to say that the climate of Victoria is so similar to that of the southern counties of England that the race remains British here, just as it would have done if it had stayed in the shires of the Old Land.

People coming to Victoria naturally expect to find a pocket edition of the great cities of the Pacific Coast. Instead they discover a community different in a thousand and one aspects. That is why travellers fresh from sights and scenes in other lands will, in the majority of cases, agree with the lady who said, after seeing Victoria, "So different, but so very interesting and beautiful — yes, beautiful!"

You will notice that the first impression is one of difference, but the last, and obviously more lasting, one of beauty. So let us compress the whole description of Victoria into the two words — unique beauty. Or we can enlarge it into Mr. Rudyard Kipling's famous word picture, "To realize Victoria you must take all that the eye admires most in Bournemouth, Torquay, the Isle of Wight, the Happy Valley at Hong Kong, the Doon, Sorrento, and Camps Bay; add

reminiscences of the Thousand Islands and arrange the whole around the Bay of Naples, with some Himalayas for the background."

In most cities there is some unique feature which the sightseer naturally visits first, and which, therefore, becomes the focal point at which all tours begin. There are many such in Victoria. One might start, on historic grounds, from Bastion Street, for this was the site of the Hudson's Bay Fort from which the city grew. Or one might start from Clover Point on the Marine Drive, for it was here that Sir James Douglas landed in 1843 from the little steamer *Beaver*, to definitely establish a trading post for the Hudson's Bay Company at Victoria. But as the great majority of visitors enter by way



A private residence near Victoria

of the Canadian Pacific docks, practically in front of the Provincial Parliament Buildings, let us start our present wanderings there.

There are three statues on the grounds in front of the Buildings. The first, from west to east, is a statue of Queen Victoria, after whom the city was named. The inscription on the next monument reads: "Erected by the people of British Columbia to the memory of Sir James Douglas, K.C.B., Governor and Commander-in-Chief from 1851 to 1864". Not only was Sir James Douglas head of the Hudson's Bay Company at Victoria but his commanding personality and wise counsels dominated and guided the whole life of the young community that soon began to grow up around the original fort. The third statue is Victoria's War Memorial, erected by the people of the city in memory of those soldiers who left here, 1914-1918, and made the supreme sacrifice in France. The base of this statue is of native British Columbia granite, the statue itself being the work of Sidney March, one of the seven March brothers of Farnborough, Kent, England, who designed war memorials for cities all over the Empire. The ground hedge bordering the driveway is of English ivy and was grown from slips. It has been kept closely clipped, and consequently the stems of the plant have climbed under and over and around one another until a living wall has been formed.

The first Parliament Buildings were erected in 1859, and consisted of five small detached pagoda-like erections scattered over the present site. The only one of these remaining faces Superior Street, and contains the Provincial Government Mineral Exhibit. The present buildings were completed in 1897 and formally opened in 1898. The grey stone used in the building came from Haddington Island, the granite steps and landings from Nelson Island, the slate on the roof from quarries in Jervis Inlet, all in British Columbia, while the marble used in the interior was brought from Italian quarries at Breccia, Paranazza and Verona. The particularly beautiful finishings and panellings in the committee rooms are of British Columbia birds-eye maple, cypress, fir, alder, cedar and spruce.

There is a fine natural history museum in the east wing, in which are specimens of practically all the fauna of British Columbia, while the Connaught or Provincial Library contains the best collection (over 190,000 volumes) in Canada west of Winnipeg. In the archives are numbers of original maps, charts and diaries, and logs of the discoverers and pioneers, not only of British Columbia but also of other parts of the Pacific Coast, and also many volumes dealing with the early history of the Pacific Northwest. Here, and in the Old Drill Hall on Menzies Street, are all sorts of Indian relics, from war canoes and massive totem poles to fishbone needles and stone arrow-heads.

The climb up the rather narrow steps to the gallery running around the outside of the base of the dome is well worth while, for from this vantage point a wonderful panoramic view of the city and surrounding country and the Straits and Gulf of Georgia, and, on a clear day, the distant coastline of the State of Washington, with the background of the eternally snowcapped Olympics and the Gulf Islands, is obtainable.

The statue on the top of the dome above our heads is that of Captain George Vancouver, of the British Navy, who was sent by the British

Government to take over Vancouver Island from the Spaniards in 1792, and was the first man to circumnavigate it. It was Captain Vancouver who, sailing up the Straits of Juan de Fuca in his ships, the *Chatham* and *Discovery,* charted and named practically all the waters and islands lying between Vancouver Island, the present State of Washington and the mainland of British Columbia, and also the majority of the bays and harbours and prominent landmarks on the mainland itself. To him we owe Puget Sound, Mount Rainier (14,408 feet high), the Gulf of Georgia—so named because Captain Vancouver discovered these waters on Monday, June 4, 1792, that being the anniversary of the birth of the then reigning English monarch, George III—Bellingham Bay, New Dungeness, Whidby Island, Mount Baker (10,827 feet high), Hood Canal, Howe Sound and Jervis Inlet.

Sunken Gardens at "Benvenuto", residence of Mr. R. P. Butchart

Looking toward the west, we see the Sooke Hills, hiding the settlement of that name and the open Pacific from us, and also sheltering the very pleasant farming districts of Metchosin and Colwood and Happy Valley from the prevailing south-westerly winds. For the same reason the sea lying under their lee, known as the Royal Roads, gives good free anchorage for large vessels. Following the coast line eastward towards Victoria we see Macaulay Plains, used chiefly in the past for military purposes. Here a fine nine-hole golf course awaits the visitor, this course being, by the way, the oldest in the Pacific Northwest. The wooden piers at the entrance to Victoria's Inner Harbour are the Rithet Docks, built in 1890, while the stone piers and breakwater (the latter being 2,750 feet in length) are known as Ogden Point Wharves, and were built by the Dominion Government, 1913-1917. These piers have a dockage depth of 40 feet, and were the only docks visited by the British Empire Special Service Squadron in its trip around the world into which the largest ships then afloat, the *Hood* and the *Repulse,* were able to enter under their own steam and tie up alongside one another.

The district lying below us and bounded on the west by the entrance to Victoria Harbour, on the south by the sea, and on the east by Beacon Hill Park, is known as James Bay, named after Sir James Douglas. It is one of the older residential parts of the city, and is still deservedly popular.

That part of the Marine Drive running around the foreshore, the sea front of James Bay, and through Beacon Hill Park to Ross Bay, is Dallas Road.

Beacon Hill Park, 154 acres in size, was given to the city by the Provincial Government in 1882. It is a good specimen of the open park land commented on by the pioneers and early comers to Victoria. It possesses one of the magnificent stands of garry oaks which are such a noteworthy characteristic of Victoria, and which proclaim by their maximum size so far north the peculiar geniality of the city's climate. The park was originally a beautiful natural wild flower garden, but is now in many parts covered with broom. This was introduced in the early days and has spread not only over this park and into other parts of the city, but northward up the Island. The glory of its massed golden bloom during spring and early summer has been praised by countless visitors from all quarters of the globe, and has been accorded special mention in a hundred and one books of travel. The park owes its name to the fact that there were in the early days two beacons on the top of the hill which, when seen in a certain position, showed mariners Brotchie's Ledge, now marked by a bell buoy. In earlier times, the aborigines used to erect poles and spread nets between them on this hill to snare birds in foggy weather. Today, the chief points of interest are Goodacres Lake, with the royal swans brought here from the King's reserves in Windsor, England, and other waterfowl; the nursery grounds, where young trees and shrubs are raised; the totem pole, which comes from the Haida tribe at Masset, Queen Charlotte Island; the Chinese Bell, brought from China at the time of the Boxer Rebellion; the tame Island deer, buffalo and *Ursus Kermodei,* the unique white bear brought from the Princess Royal Island, and the only one of its species in captivity.

Following the shore line east of Beacon Hill Park is the Fairfield district, once devoted to farming and market gardens, today one of the better known residential sections. Many of the beautiful gardens that Victoria is famous for are to be found here. Adjoining are Ross Bay and Foul Bay in the order named, both covered with homes. Foul Bay, by the way, gets its name from the poor anchorage found there. The hill to the immediate east is Gonzales, one of

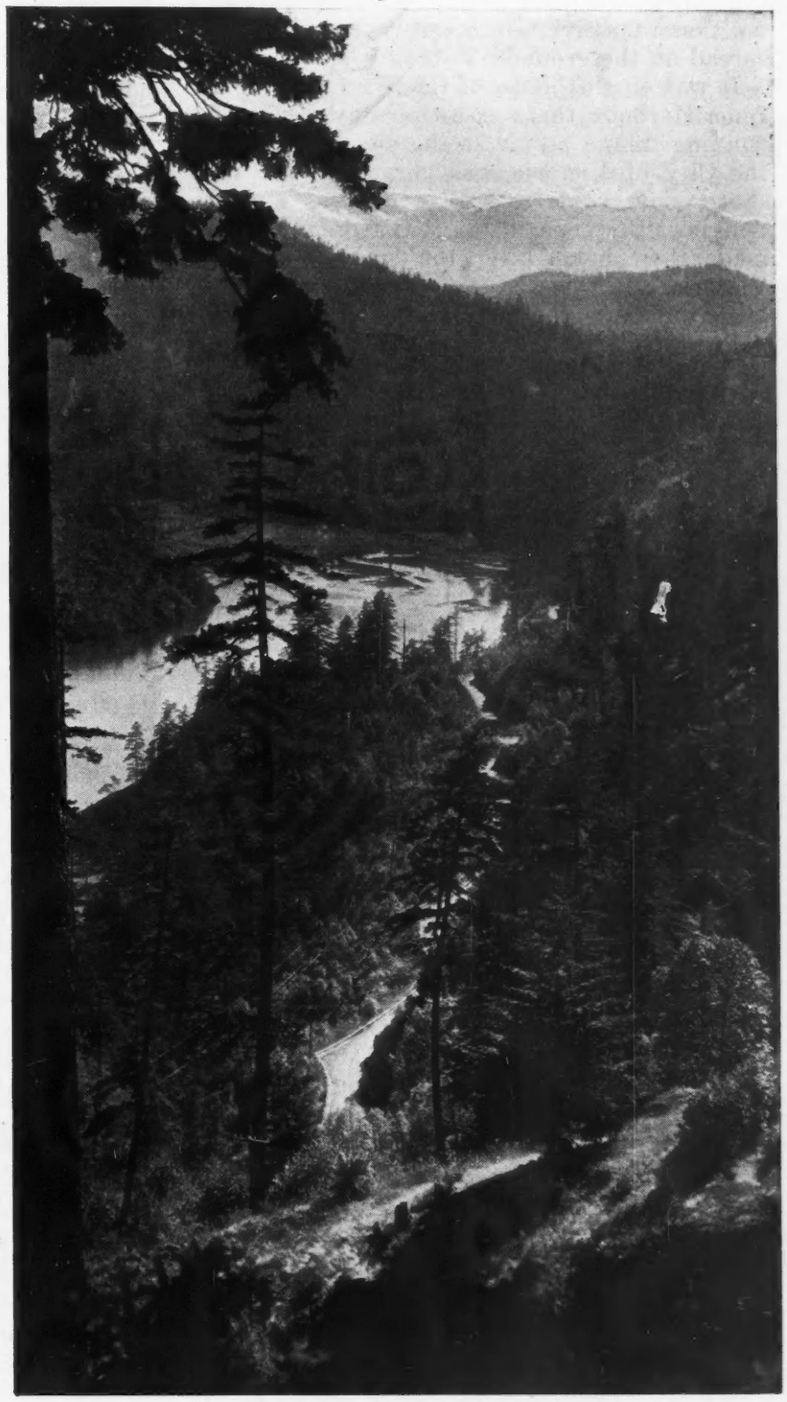
the few places on Vancouver Island named by the early Spanish discoverers in 1790. The western end of Gonzales Hill is occupied by the Dominion Meteorological Government Observatory and the Wireless Station. The observatory is one of the first landmarks picked up when approaching Victoria. It was erected in 1914. The main floor is devoted to the reception of weather reports from over 200 stations in British Columbia and the Yukon.

The bay immediately below the hill is named after Captain William H. McNeill, born in Boston, Mass., in 1803. He came to British Columbia in command of the American brig *Llama* in 1831, and made one of the earliest examinations of the coast while in command of the pioneer steamer *Beaver*. Almost adjoining is the famous Victoria Golf Club, famous for two reasons—first, for the wonderful view of the sea and mountains obtained from it, and ranked by many travellers as one of the seven finest views in the world; and also as the only course in the whole of North America where golf is played every day throughout the year.

Somebody once called Oak Bay district a "sea-side park of beautiful homes," and the description is so apt that it would be futile to try and improve or amplify it.

The next bay up the coast was named after the Hudson's Bay Company ship, the *Cadboro*. This inlet was the site of the village of the Songhee Indians prior to the building of Fort Victoria. An Indian defensive trench can still been seen on Spurn Head, and the Mystic Spring, famous in Indian legends, wells out from the ground at this point. In the Uplands residential district is another beautiful stand of the famous garry oaks, not only the stately pioneer trees, but the gnarled, distorted and fantastic rockland type.

Now having followed the compass round from west to northeast, let us bring our attention back to that part of the city lying immediately below us as we stand on the gallery outside the dome of the Parliament Buildings. The site of the Causeway and the Empress Hotel and Crystal Gardens was, until 1904, a shallow continuation of the inner harbour, and at most tides a mud-flat. Indians say that in the early days the inner harbour ran in the form of a narrow creek through Fairfield, coming out to the sea at Ross Bay, and that at high tides they used to come through this way in their canoes from Ross Bay to Victoria. The first bridge, a wooden structure, was built across this neck of water (then called James Bay) in 1859. In



Malahat Scenic Drive

1904 the mud flats were filled in and the present causeway built, the Empress Hotel being opened in 1908. In order to make a secure foundation, the mud was pumped out and gravel dumped in, and great wooden piles, some ninety feet long, were driven down into the soil until bedrock was reached. The Crystal Gardens, built in 1925, and containing a great warm sea-water 150-foot swimming tank, private salt water baths, peacock promenades and dance rooms, and floral balconies, badminton courts, auditorium and bowling greens, is built on a massive reinforced concrete mattress spread on the ground.

It was on the banks of the West Arm of the Inner Harbour, that narrowing stretch of water running inland as far as the eye can see, that the City of Victoria was born. On the west shore, now covered with factories, was the Songhees' Reserve, where that tribe of Indians made their home after the building of Fort Victoria. It was also the camping ground of large numbers of other Indians from up-island points come down to trade with the Hudson's Bay Company. On the Gorge at the head of this arm was the Hudson's Bay farm. Here the first sawmill was erected, the first school built, and the first Island bricks made. On the east shore, the present site of Bastion Street, about a quarter of a mile from us, was the Fort itself. It was built in 1843 and stood until 1860. The original fort had two bastions, one at the north and one at the south corner, covered an acre of land, and was enclosed by palisades.

Of special interest outside the city boundaries are the Sunken Gardens at Benvenuto, Mr. R. P. Butchart's country home, twelve miles from Victoria; the Dominion Government Astronomical Observatory containing the second largest telescope of its kind in the world (8 miles distant); the Dominion Government Experimental Farm in Saanich (16 miles distant); and the Malahat Mountain Drive, rising to over 1,250 feet above the sea, 18 miles north of the city.

J. H. MOORE,

Chairman of the Local Committee on Publicity.

PROGRAM FOR THE SIXTY-SEVENTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, TO BE HELD IN VICTORIA, B.C., ON JUNE 22, 23, 24, 25, 26, 1936

Convention Headquarters, Empress Hotel

Monday, June 22nd

9.00 a.m.—Registration.
9.30 a.m.—Meeting of Council.
12.30 p.m.—Luncheon—Members of Council to be Luncheon Guests of the President-Elect, Dr. H. M. Robertson.
Valedictory Address of the President, Dr. J. C. Meakins, Montreal.
2.00 p.m.—Meeting of Council.
4.00 p.m.—Tea and Reception—Hostesses, Mrs. Norman Yarrow and Mrs. J. W. Spencer.
5.00 p.m.—Meetings of Committees.
6.00 p.m.—Meeting of Nominating Committee.
9.00 p.m. to 1.00 a.m.—Dancing and Bridge, Empress Hotel.

Tuesday, June 23rd

9.30 a.m.—Meeting of Council.
12.30 p.m.—Luncheon.
2.00 p.m.—Meeting of Council.
2.15 p.m.—Official Opening of Exhibit Hall.
3.00 p.m.—Garden Party at "Benvenuto", the home of Mr. and Mrs. R. P. Butchart.

Tuesday, June 23rd—*Continued*

4.00 p.m.—Annual Meeting of the British Columbia Medical Association.
5.00 p.m.—Annual Meeting of the Canadian Medical Protective Association.
7.00 p.m.—Members of the Council of the Canadian Medical Association and the British Columbia Medical Association to be guests of the British Columbia Medical Association and the Victoria Medical Society at dinner at the Empress Hotel.
9.00 p.m.—Annual Meeting of the College of Physicians and Surgeons of British Columbia.

Wednesday, June 24th

8.30 a.m.—Registration.
9.00 a.m.—General Session in the Ball Room.
12.15 p.m.—Official Photograph of the Convention.
12.30 p.m.—Luncheon.
2.00 p.m. to 5.00 p.m.—Sectional Meetings.
4.00 p.m. to 6.00 p.m. — Garden Party at Mrs. James Dunsmuir's home, "Hatley Park".

Wednesday, June 24th—*Continued*

8.30 p.m.—Annual General Meeting, to which all members and their ladies, guest speakers and official delegates are invited.
Music.

9.00 p.m.—Call to Order by the President.
- Invocation.
- Introduction of Guest Speakers and Official Delegates.
- Presentation of Frederic Newton Gisborne Starr Award to Sir Frederick Banting, Dr. Charles Best, and Dr. J. B. Collip.
- Announcement of Fellowships.
- Installation of the President.
- Address of the President.
- Reception by the President and Mrs. Robertson, to be followed by dancing, cards and refreshments.

Thursday, June 25th

9.00 a.m. to 12.00—Sectional Meetings.

12.30 p.m.—Luncheon.

2.00 p.m. to 5.00 p.m.—General Sessions.

2.00 p.m.—Meeting of incoming Executive Committee.

4.00 p.m.—Dr. and Mrs. Hermann M. Robertson's Reception and Garden Party at "Clovelly", the home of Lady Barnard.

9.30 p.m. to 1.00 a.m. — Cabaret Supper and Dance.

Friday, June 26th

9.00 a.m. to 12.00 noon—General Sessions.

12.30 p.m.—Luncheon.

2.00 p.m.—Annual Golf Tournament for The Ontario Cup.

5.00 p.m.— Reception at Government House (informal).

7.00 p.m.—Alumni Dinners and Class Reunions.

GENERAL SESSIONS

Place of Meeting—Ball Room, Empress Hotel

Wednesday, June 24th

9.00 a.m. Primary tumour of bone (Lantern Demonstration).—Dr. A. T. Bazin, Montreal;

Results in the medical treatment of gastric ulcer.—Dr. E. E. Cleaver, Toronto;

Curability of cancer of the stomach. —Dr. Verne Hunt, Los Angeles, Calif.;

Wednesday, June 24th—*Continued*

Tumours of the upper urinary tract. —Dr. F. S. Patch, Montreal;

The present trend in anæsthesia.— Dr. Beverley C. Leech, Regina;

Embolism and thrombosis of the larger arteries; their diagnosis and treatment. — Dr. Duncan Graham, Toronto.

Thursday, June 25th

2.00 p.m. Silicosis research.—Sir Frederick Banting, Toronto;

Methods of administration of hormones with special reference to protamine insulin. — Dr. Charles Best, Toronto;

The significance of recent investigations on the ductless glands.— Dr. J. B. Collip, Montreal;

Diverticulitis of the sigmoid colon. —Dr. R. R. Graham, Toronto;

A review of some aspects of the surgery of the sympathetic nervous system. — Dr. John Gunn, Winnipeg;

The medical treatment of ringworm of the scalp.—Dr. D. E. H. Cleveland, Vancouver.

Friday, June 26th

9.00 a.m. A practical consideration of the mineral and vitamin requirements of man.—Dr. F. F. Tisdall, Toronto;

Mortality and morbidity in acute appendicitis.—Dr. Gordon Fahrni, Winnipeg;

Vascular episodes.—Dr. E. L. Pope, Edmonton;

The treatment of carcinoma of the cervix.—Dr. Jas. C. Masson, Rochester;

The Lister Oration. — Dr. E. W. Archibald, Montreal.

SECTIONAL MEETINGS

(Note: All members and visitors who have registered are eligible to attend any of the Sectional Meetings).

Section of Ear, Nose and Throat

Wednesday, June 24th

2.00 p.m. A discussion of septicæmia and sinus thrombosis.—Dr. A. T. Wanamaker, Seattle;

2.30 p.m. Results of radical antral operations. Dr. G. C. Draeseke, Vancouver;

Wednesday, June 24th—*Continued*

3.00 p.m. Measured blood loss in certain nose and throat operations.—Dr. F. D. McKenty, Winnipeg;

3.30 p.m. Endoscopy with report of two hundred cases.—Dr. A. D. McCannel, Minot, N.D.;

4.00 p.m. Effects of the pituitary upon atrophic rhinitis and otosclerosis.—Dr. Percy Wright, Montreal.

Section of Medicine

Wednesday, June 24th

2.00 p.m. Myxœdema: some common errors in its diagnosis and treatment.—Dr. H. D. Kitchen, Winnipeg;

2.30 p.m. Interpretation of heart symptoms.—Dr. H. H. Jennings, Calgary;

3.00 p.m. The interpretation of some common digestive symptoms.—Dr. J. W. Scott, Edmonton;

3.30 p.m. Epilepsy in general practice.—Dr. R. G. Armour, Toronto;

4.00 p.m. Our present position with regard to psoriasis.—Dr. Harold Orr, Edmonton.

Thursday, June 25th

9.00 a.m. Prognosis in coronary thrombosis.—Dr. G. F. Strong, Vancouver;

9.30 a.m. Peripheral vascular disease.—Dr. J. M. McEachern, Winnipeg;

10.00 a.m. Intestinal absorption in its relation to allergy.—Dr. Robert L. Benson, Portland, Ore.;

10.30 a.m. Some observations from the chest examinations of 40,000 people.—Dr. W. H. Hatfield, Vancouver;

11.00 a.m. Functional disorders of the colon.—Dr. E. P. Scarlett, Calgary;

11.30 a.m. Silicosis.—Dr. C. H. Vrooman, Vancouver.

Environment and the neuroses (to be read by title).—Dr. Ruth Maclachlan Franks, Toronto.

Section of Military Medicine

Thursday, June 25th

12.30 p.m. Luncheon—to be followed by these papers:

The importance of medical military documentation and its relation to pension matters.—Col. Fred C. Bell, C.M.G., D.S.O., Ottawa;

The treatment of wounds in French hospitals.—Major J. L. Petitclerc, C.A.M.C., O.C., Quebec.

Section of Obstetrics and Gynæcology

Wednesday, June 24th

2.00 p.m. Chairman's Address.—Dr. J. R. Fraser, Montreal;

2.30 p.m. Further experience in amnesia and analgesia in obstetrics.—Dr. L. C. Conn, Edmonton;

3.00 p.m. Discussion.

3.15 p.m. The present status of endocrine therapy in gynæcological and obstetrical problems.—Dr. A. D. Campbell, Montreal.

3.45 p.m. Discussion.

Thursday, June 25th

9.00 a.m. External cephalic version.—Dr. F. G. McGuinness, Winnipeg;

9.30 a.m. Discussion.

9.45 a.m. Rheumatic heart disease and pregnancy.—Dr. D. N. Henderson, Toronto;

10.15 a.m. Discussion.

10.30 a.m. A personal series of hysterectomies and myomectomies, with a comparison of results of total hysterectomies *vs.* supra-vaginal hysterectomies and some points in technique.—Dr. J. J. Mason, Vancouver;

11.00 a.m. Discussion.

11.15 a.m. Endometrial hyperplasia.—Dr. Murray Blair, Vancouver;

11.45 a.m. Discussion.

Section of Ophthalmology

Thursday, June 25th

9.00 a.m. Clinical demonstration—cases—apparatus.

10.00 a.m. Conjunctival melanomata.—Dr. A. E. MacDonald, Toronto;

10.30 a.m. Essentials in the treatment of detached retina.—Dr. W. G. M. Byers, Montreal.

11.00 a.m. Practical perimetry: construction and operation of tangent screen.—Dr. A. J. McLean, Portland, Ore.

Section of the North Pacific Pædiatric Society in Conjunction with the Pædiatric Section of the Canadian Medical Association

Wednesday, June 24th

9.00 a.m. A case of Hirschsprung's disease.—Dr. W. E. M. Mitchell, Victoria;

9.30 a.m. A case of Addison's disease.—Dr. R. A. Hunter, Victoria;

Wednesday, June 24th—*Continued*

10.00 a.m. Two unusual cases of congenital heart malformation. — Dr. Glenn Simpson, Victoria;

10.30 a.m. The adrenal cortex in relation to conditions in childhood. — Dr. N. Kemp, Vancouver;

2.00 p.m. Foot deformities in childhood and their treatment.—Dr. K. J. Haig, Vancouver;

2.30 p.m. Survey of congenital syphilis in Vancouver.—Dr. E. J. Curtis, Vancouver;

3.00 p.m. Fatigue in children.—Dr. George E. Lamont, Vancouver;

3.30 p.m. Indications for antitoxin and toxoid therapy in osteomyelitis.—Dr. C. E. Dolman, Vancouver.

Thursday, June 25th

9.00 a.m. Mental hygiene in relation to infants and children. — Dr. R. P. Kinsman, Vancouver;

9.30 a.m. Measles encephalitis. — Dr. Harold W. Price, Calgary;

10.00 a.m. Basal anæsthesia in children's surgery.—Dr. Herbert E. Coe, Seattle;

10.30 a.m. Intracranial hæmorrhage of the newborn.—Dr. Urban J. Gareau, Regina.

Section of Radiology

Wednesday, June 24th

2.00 p.m. Chairman's address.—Dr. B. J. Harrison, Vancouver;

2.30 p.m. Quality of roentgen rays, its measurement and importance (Discussion).—Dr. R. R. Newell, Stanford University;

3.00 p.m. Common errors in the diagnosis and treatment of malignancy.—Dr. E. E. Shepley, Saskatoon;

3.30 p.m. Discussion on the radiotherapeutical care of breast cancer.—Dr. C. M. Henry, Regina;

4.00 p.m. Discussion on the relationship of the roentgenologist and the hospital. —Dr. B. J. Harrison, Vancouver.

Thursday, June 25th

9.00 a.m. The roentgenographic image of bone lesions (Discussion).—Dr. C. G. Sutherland, Rochester;

9.30 a.m. Some of the limitations of x-ray (Discussion)—Dr. Bernard Mooney, Edmonton;

Thursday, June 25th—*Continued*

10.00 a.m. X-ray treatment of the tonsils (Discussion).—Dr. Walter Morrish, Edmonton;

10.30 a.m. Discussion on radiotherapeutical care of cancer of the uterus.—Dr. W. H. McGuffin, Calgary.

Section of Surgery

Wednesday, June 24th

2.00 p.m. Breast cancer.—Dr. M. R. MacCharles, Winnipeg;

2.45 p.m. Sequelæ of head injury. — Dr. Frank Turnbull, Vancouver;

3.30 p.m. Institutional care in the treatment of poliomyelitis.—Dr. F. H. Mewburn, Edmonton;

4.15 p.m. Thoracoplasty: report of cases.—Dr. J. S. Burris, Kamloops.

Thursday, June 25th

9.00 a.m. Acute pancreatitis.—Dr. P. H. T. Thorlakson, Winnipeg;

9.45 a.m. Apical pulmonary tuberculosis with conservation of healthy lung.—Dr. Emile Holman, San Francisco;

10.30 a.m. Incision for difficult splenectomy.—Dr. Lyon Appleby, Vancouver;

11.15 a.m. Our experience with the hormone treatment of the adenomatous prostate.—Dr. R. A. McComb, Toronto.

Section of Urology

Wednesday, June 24th

2.00 p.m. Present status of prostatic surgery. —Dr. Lee Smith, Vancouver.

2.30 p.m. Bilateral renal calculi; the problem recurrence. — Dr. A. B. Hepler, Seattle;

3.00 p.m. Congenital polycystic kidneys.—Drs. F. S. Patch and John Davidson, Montreal.

General Information

Railway Certificates

Identification Certificates are available for those desiring them. Please write the General Secretary if you wish one; but before purchasing your transportation check with your local ticket agent regarding comparative costs under the Summer Tourist rate and the rate you would secure by using the Identification Certificate.

Hotel Accommodation

Empress Hotel.—Single room with bath, $4.00; double room with bath, $6.00.

Dominion Hotel (About 7 city blocks from headquarters).—Single room without bath, $1.50; double room without bath, $2.50; single room with bath, $2.50; double room with bath, $3.50. Weekly rate as above, less one day deduction. Meals: breakfast, from 25c.; luncheon, from 50c; dinner, from 60.c; also à la carte.

Oak Bay Beach Hotel (About 3 miles from headquarters—transportation each morning included in rates).—Single room with bath and breakfast, $4.00; double room with bath and breakfast, $6.00; twin beds with bath and breakfast, $7.00. Meals: breakfast, 75c.; luncheon, 1.00; dinner, 1.25.

Strathcona Hotel (About 2 city blocks from headquarters).—One person with use of bath, $1.50; two persons with use of bath, $2.00; one person with private bath, $2.00; two persons with private bath, $3.00; twin beds with bath, $3.50 and $4.00. Weekly rates.—Single with use of bath, $7.00; double with use of bath, $10.00; single with private bath, $10.00; double with private bath, $15.00.

Glenshiel Hotel (About 2 city blocks from headquarters).—Single room without bath, $1.50; double room without bath, $2.50; single room with bath, $2.50; double room with bath, $3.50. Weekly rates as above, less one day deduction.

Windermere Hotel (About 3 city blocks from headquarters).—Single room without bath, from $1.50; single room with bath, $3.00; double room without bath, from $2.50; double room with bath, $4.00. Weekly rate as above, less one day deduction. Meals, breakfast, 50c.; luncheon, 50c.; dinner, 75c.

James Bay Hotel (About ¾ mile from headquarters).—Single room without bath, $1.50; double room without bath, $2.50; single room with bath, $2.00; double room with bath, $3.00. Weekly rates as above less one day deduction. Meals: breakfast, 25c.; luncheon 50c.; dinner, 75c.

Douglas Hotel (About 10 city blocks from headquarters).—Single room without bath, $1.25 to $1.50; single room with bath, from $2.00; double room without bath, $2.00; double room with bath, $3.00. Weekly rates.—Single room without bath, $5.00; single room with bath, from $10.00; double room without bath, from $8.00; double room with bath, $15.00. Meals: breakfast, 25c. and up; luncheon, 25c. and up; dinner, 35c. and up.

Registration

The Registration Desk will be in the Ball Room Foyer of the Empress Hotel.

Badges for members will be issued on Registration.

The members of the Victoria Medical Society will wear Blue Ribbon Badges.

The members of the Council will wear Red Ribbon Badges.

Visiting ladies will register in the Ladies' Reception Room. They will be supplied with a convention badge and will be give programs containing full information regarding entertainments and functions.

The Ladies' Committee will wear White Ribbon Badges with "Ladies' Committee" printed thereon.

Exhibits

All Commercial Exhibits will be placed in the Foyer of the Empress Hotel.

The official opening of the Commercial Exhibits will take place on Tuesday, June 23rd, at 2.15 o'clock.

The Local Committee requests that Exhibitors be given the encouragement they deserve.

Luncheons and Dinners

Luncheons for members will take place daily at 12.30 p.m. in the Empress Hotel.

Tickets for these luncheons will be $1.00 and may be obtained from the cashier at the front office.

There will be no C.M.A. Annual Dinner.

There will be a Cabaret Supper Dance on Thursday at 9.30 p.m.

Alumni Dinners will be held on Friday evening at 7.00 p.m., when all graduates of Canadian universities will attend as college units. American visitors, not graduates of Canadian universities, will be welcome at any of these dinners.

A Ladies' Dinner will be held in the Grill Room of the Empress Hotel on Friday, June 26th, at 7.30 p.m.

Annual General Meeting

The Annual General Meeting will be held in the Ball Room of the Empress Hotel on Wednesday evening, commencing at 8.30 p.m. This will include the presentation of Awards and Fellowships, the Installation of the new President, and will be followed by the President's Reception and a Dance.

Golf

The Annual Golf Tournament of the Canadian Medical Association will be held at the Victoria Golf Club on Friday, June 26, 1936.

The program is as follows:—

1. The Ontario Cup—will be 18 holes medal round with full handicap allowance (limit 24). Winner receives Ontario Cup for one year and a miniature; prize for runner-up; prize for best gross score; prize for runner up.

2. An endeavour will be made to have international and interprovincial team matches at the same time.

There are four 18-hole golf courses and one 9-hole golf course and playing privileges will be extended to the visiting members and guests of the Canadian Medical Association.

Final arrangements, starting time, transportation, etc., will be announced during the convention.

TENNIS

By courtesy of the Victoria Lawn Tennis Club excellent courts are available for the game. Kindly enquire at the desk.

BOWLING, RIDING, SWIMMING, FISHING (trout and salmon) will be available to those who wish.

CRYSTAL GARDEN

The Crystal Garden and its salt-water swimming pool should prove popular. Special terms have been arranged for this meeting. Tickets may be secured at the Crystal Garden.

QUARANTINE STATION AND LEPER COLONY

Through the kindness of the Minister of the Department of Pensions and National Health and Dr. H. E. Tremayne, Quarantine Officer-in-charge, small parties are invited to visit William Head and the Leper Colony on Bentinck Island. Those interested are asked to enquire at the Registration Desk.

ASTRO-PHYSICAL OBSERVATORY

Many visitors will be interested in seeing the Astro-Physical Observatory at Little Saanich Mountain. Arrangements have been made through the courtesy of the Director, Dr. W. E. Harper, for a party to visit the Observatory on Thursday evening. Those wishing to do so will please register for this trip, and transportation will be provided.

ENTERTAINMENT

Members and visitors are requested to register early and to signify the entertainment features which they wish to attend.

4.00 p.m. Monday—Tea and Reception at Mrs. Norman Yarrow's and Mrs. J. W. Spencer's.

9.00 p.m. Monday—Dance and Bridge at the Empress Hotel.

3.00 p.m. Tuesday—Garden Party at Mr. and Mrs. R. P. Butchart's famous Sunken Gardens.

7.00 p.m. Tuesday—Annual Dinner to the Council of the Canadian Medical Association and British Columbia Medical Association.

4.00 p.m. Wednesday—Garden Party at Mrs. James Dunsmuir's.

9.00 p.m. Wednesday—Annual General Meeting of Canadian Medical Association.

4.00 p.m. Thursday—Dr. and Mrs. Hermann M. Robertson's Reception and Garden Party at "Clovelly", the home of Lady Barnard.

9.30 p.m. Thursday—Cabaret Supper and Dance.

2.00 p.m. Friday—Annual Golf Tournament.

5.00 p.m. Friday—Reception at Government House.

7.00 p.m. Friday—Alumni Dinners.

CANADIAN MEDICAL PROTECTIVE ASSOCIATION

The Canadian Medical Protective Association will hold its Annual Meeting on Tuesday at 5.00 p.m. All members are urged to attend. The Officers are: *President,* Dr. J. Fenton Argue, Ottawa; *Secretary-Treasurer,* Dr. T. L. Fisher, Ottawa.

ACKNOWLEDGMENTS

The Canadian Medical Association wishes to express its sincere thanks and appreciation for kindly favours extended by the following, who have assisted very materially towards the successful carrying out of this Convention: The Honourable The Premier, Mr. T. D. Pattullo; His Worship Mr. David Leeming, Mayor of Victoria; Lady Barnard; Mr. and Mrs. R. P. Butchart; Mrs. James Dunsmuir; Dr. W. E. Harper; the Victoria and Vancouver Island Publicity Bureau; the Victoria Golf Club; the Colwood Golf and Country Club; the Uplands Golf Club; the Esquimalt Golf Club; the Gorge Vale Golf Club; the Victoria Lawn Tennis Club; the Canadian Pacific Railway Company; the Canadian National Railways; the *Victoria Daily Colonist;* the *Vivtoria Daily Times.*

Ladies' Program

Monday, June 22nd

4.00 - 6.00 p.m.—Tea and Reception, Hostesses, Mrs. Norman Yarrow and Mrs. J. W. Spencer.

9.00 p.m. - 1.00 a.m.—Dance and Bridge, Empress Hotel.

Tuesday, June 23rd

3.00 p.m.—Garden Party at "Benvenuto", the home of Mr. and Mrs. R. P. Butchart.

9.00 p.m.—Bridge Tournament, Empress Hotel.

Wednesday, June 24th

1.00 p.m.—Luncheon at Oak Bay Golf Club.

4.00 to 6.00 p.m.—Garden Party at "Hatley Park", the home of Mrs. James Dunsmuir.

Wednesday, June 24th—*Continued*

8.30 p.m.—Music—Empress Hotel.

9.00 p.m.—Annual General Meeting, Empress Hotel.

Thursday, June 25th

4.00 – 6.00 p.m.—Dr. and Mrs. Hermann M. Robertson's Reception and Garden Party at "Clovelly", the home of Lady Barnard.

9.30 p.m. – 1.00 a.m.—Cabaret, Empress Hotel.

Friday, June 26th

Golf Tournament and Tea, Oak Bay Golf Club.

5.00 p.m.—Reception at Government House (informal).

7.30 p.m.—Dinner, Music and Bridge, Empress Hotel.

Mornings

10.00 – 12.00 a.m.—Arrangements will be made for tennis, golf, riding, rides, swimming, fishing and viewing gardens.

REGISTRATION

A room at the Empress Hotel will be reserved for the use of ladies attending the Convention. All ladies are asked to register there on their arrival and to indicate as early as possible which of the morning, afternoon, and evening arrangements they will be able to attend; in this way transportation and other details will be much facilitated and long delays avoided.

The Ladies of the Reception Committee will be in the Ladies' Room at the following times: Monday—9.30 a.m. to 12 noon. Tuesday—9.30 a.m. to 4 p.m. Wednesday—9.30 a.m. to 4.00 p.m. Thursday—9.30 a.m. to 3.00 p.m. Friday —9.30 a.m. to 4.00 p.m. They will distribute Convention Badges at the time of registration, and will be pleased to give any information about the Convention, Program, or such matters as the best shopping centres, the whereabouts of good oriental stores or such points of interest as the Parliament Buildings, its museum, archives, etc.

MORNING PROGRAM

Committee members will be in the Ladies' Room at the Empress Hotel each morning from 9.30 to 10.30 a.m. to arrange for parties, matches, transport, etc., etc.

GARDENS

Arrangements have been made by the Committee in conjunction with members of Victoria's Horticultural and Rock Garden Societies for visitors to see some of the loveliest private gardens.

GOLF

All ladies wearing the Convention Badge will be admitted to the local golf courses. Twosomes, foursomes, and transportation to the more distance courses, such as Colwood, can be arranged with members of the Golf Committee.

TENNIS

The Victoria Tennis Club is giving free use of its courts to members of the Convention. The Committee will be pleased to make arrangements for games.

RIDING

The riding schools in the district have been approached that satisfactory horses may be reserved for Convention members. Good stretches of turf can be found in Uplands and Beacon Hill Park.

SWIMMING

The swimming pool at the Crystal Gardens is one of the finest on the West Coast. Tickets at a reduced rate may be obtained by Convention members wearing their Badges from members of the Swimming Committee.

FISHING

Within a few miles of Victoria excellent fishing is available. Transportation and arrangements may be made through the fishing committee.

A Criticism of the Constitution and By-laws of the Proposed Federation of the Canadian and Provincial Medical Associations

As a past-president of the Ontario Medical Association I wish to offer some comments on the draft constitution and by-laws of the proposed federation of the provincial associations with the Canadian Medical Association. While I am in sympathy with the desire to establish a representative national medical organization along federal lines I do not believe that this desirable object will be attained under the plan now submitted for consideration.

Apparently the committee of the Canadian Medical Association recognizes that it is essential for the success of the proposed organiza-

tion to build up the membership of the constituent associations, and I agree entirely with this conclusion. I am, however, opposed on principle to any suggestion of compulsory membership, or to the collection of Association fees by the College of Physicians and Surgeons, or of doing anything else that may jeopardize the existence or impair the usefulness either of the Ontario Medical Association or the College. Any attempt at compulsion or coercion of the medical profession may seriously undermine the loyal support which has been voluntarily accorded, in increasing degree, to both the Ontario Medical Association and the Canadian Medical Association by the doctors of this province.

A careful study of the draft constitution and by-laws makes it readily apparent that control of the proposed organization and ultimately of the medical profession of Canada, in most of its important activities, is to be vested almost entirely in the hands of a small executive committee of the Canadian Medical Association or a quorum thereof. I do not believe that any committee either acting alone or in conjunction with one of the provincial associations should be given authority to speak for the organized medical profession of Canada.

The annual meetings of the Canadian Medical Association are really meetings of its executive body with one of the nine provincial associations, at which meetings there is present only a sprinkling of the membership of the eight other provincial associations. In the intervals between meetings a *quorum* (5) of the executive of the Canadian Medical Association functions independently of any general control whatever, and yet assumes to speak and act for the organized medical profession of Canada.

Under the proposed constitution the executive committee is in large measure permanent and self-perpetuating, and its members are reimbursed for their expenses for attendance at meetings. I am offering no criticism of the payment of the expenses of the executive committee, but am mentioning it only to point out that the members of the proposed General Council and of other committees of the Canadian Medical Association, whose expenses are not paid, judging by past experience, will not attend the meetings of the Canadian Medical Association in large numbers outside their own province, and therefore the powers on paper accorded the representatives of the provincial associations will remain largely unexercised.

The proposed plan of organization does not provide for a federation of autonomous provincial associations to form a national organization, but rather, as before stated, for meetings of the executive of the Canadian Medical Association with one of the provincial associations, which obviously is not a meeting representative of the Canadian medical profession. A representative meeting of the whole medical profession of Canada could be brought about under an organization providing for a Congress of the provincial associations, held at intervals of three, four or five years, at such central points as Winnipeg, Ottawa or elsewhere, and this, I suggest, should be considered as a guiding principle for the organization of a national body.

The Ontario Medical Association has had a long history of service in the interests of the profession of the province, and for many years has been closely affiliated with the national association. If the proposed constitution and by-laws come into effect, the members of the Ontario Medical Association, in addition to payment of the provincial fee, will have to undertake the collection of a fee of $8.00 from some 700 of its members, who are non-members of the Canadian Medical Association, or will have to drop from membership in the Ontario Medical Association those who do not wish to pay the fees for membership in both associations. It is quite probable that many of the present members of the Ontario Medical as well as other provincial associations, may prefer to take advantage of the provision in the proposed constitution and by-laws, to become members of the Canadian Medical Association directly and receive the Association *Journal*, and drop their membership in the provincial associations entirely. This is a matter for serious consideration, for it is obvious that a strong united national organization cannot be built on division or on weakening of the constituent provincial bodies.

On the other hand a Congress of the provincial associations could be provided for, without the autonomy or interests of the provincial associations being compromised, and a national organization on such basis would constitute a real federation — a representative Canadian Medical Association. The executive committee then could function at and in the intervals of meetings, largely as at present, but without assuming to speak for the Canadian profession except after the approval of their actions by the provincial associations or their executives.

If the proposed constitution is adopted by the provinces the result will be not a federation at all but rather an organic union or merger in which the ultimate power and authority will be vested in the executive of the Canadian Medical Association consisting of thirteen members elected by the General Council, and seven *ex officio*, with a quorum of five practically in control.

Apparently there is a strong sentiment in favour of a real federation, preserving provincial autonomy, and it will be unfortunate if hasty action is taken before sufficient time and

opportunity has been afforded for a careful study of the question by constituent associations and societies. A satisfactory constitution for a confederation as far as possible should be uniform for all the provinces and should be formally approved by all before it comes into effect in any province. Dr. McEachern evidently had this principle in mind when he stated that "the plan in its final form must be acceptable to the provinces, or of course it will not be adopted." In my opinion the admission of Alberta to the Canadian Medical Association under conditions not yet approved by other provinces was a serious mistake in procedure.

A federation such as I have suggested is evidently what the organizers of the Canadian Medical Association had in view following the confederation of the provinces in 1867. Confederation provided for a proportionate representation of the provinces in a federal parliament and not for meetings of an executive of the federal government, with one of the provincial legislatures undertaking to legislate for the whole Dominion, and the provinces were designated as such by their own names and not as "divisions" of the Dominon of Canada. A satisfactory federation should recognize the important and equitable principle enunciated by Dr. McEachern in 1934 when the suggestion of a federation of the provincial associations with the Canadian Medical Association was first brought forward, *viz.*, "if and when the plan is adopted nationally, it will not in any way interfere with provincial autonomy nor will it permit of any outside interference in provincial matters."

Notwithstanding this assurance, and also Article XIV of the proposed constitution that "no provision of the constitution or by-laws . . . shall interfere with the status of a division as a provincial organization", may I direct attention to the powers accorded two of the committees provided for and to be appointed by the executive of the Canadian Medical Association, *viz.*, the Committee on Legislation (Chapter VIII, Section 2) and the Committee on Economics (Chapter VIII, Section 10).

SECTION 2—COMMITTEE ON LEGISLATION

"All matters relating to medical legislation, *federal* or *provincial*, and all matters requiring legislative action (made or contemplated) arising within the Association or *any of its branches*, or *any of its committees*, shall be referred to the Committee on Legislation for information and for *any necessary action.*"*

SECTION 10—COMMITTEE ON ECONOMICS

"It shall be the duty of the Committee on Economics, excepting where otherwise provided, to deal with (a) Social legislation which includes medical services or benefits presumably for medical services; (b) remuneration and employment of physicians by lay bodies, hospital or official bodies, including *Federal, Provincial* and Municipal Governments."*

* Italics mine.—H.B.A.

It is scarcely credible that the committee responsible for the proposed constitution is serious in expecting the provinces to approve of the flagrant invasion of provincial rights and autonomy indicated by the powers assigned to these as well as to other committees to be appointed by the executive of the Canadian Medical Association, and the medical profession of Canada should awaken to their serious import. If the constitution is approved these committees will be empowered to deal with the Federal and all Provincial legislatures on such important matters as State Medicine and Health Insurance, without reference to the provincial associations, the Colleges of Physicians and Surgeons or other responsible bodies.

Exception also may reasonably be taken to the provisions and wording of Section 5, Chapter X, of the By-laws, especially if membership is made compulsory, with the unpleasant implications regarding the status of members:

"By subscribing to the application for membership under the terms of the by-laws and code of ethics and becoming a member of the association, every member **attorns to these by-laws* and agrees to such right of discipline as aforesaid and thereby specifically waives any right or claim to damage in the event of his being disciplined."

Perhaps all will agree that the sparse population of Canada and the long distances separating the provinces are the chief obstacles in the way of a satisfactory national organization of the profession. These are difficulties such as the British Medical Association does not have to contend with at all, and therefore a form of organization applicable to the latter does not properly apply to conditions in Canada. It is well known that branches of the British Medical Association in Canada never have prospered and that the only bond of union has been through the *British Medical Journal* and an occasional meeting of the British Medical Association in Canada.

In conclusion, I would again emphasize the importance of careful deliberation and a thorough canvassing of the whole question in order to avoid action which may lead to dissension and division rather than to a united national organization approved and supported by all the provinces.

H. B. ANDERSON.

Toronto,

April 11, 1936.

* "Attorn—Feudal law. To turn or transfer homage from one feudal lord to another; to render homage and service (to a lord). This is the act of feudatories, vassals or tenants . . . ."

(Webster's New International Dictionary.)

Italics mine—H.B.A.

A Reply to Dr. Anderson

For those who have not followed closely the business affairs of the Canadian Medical Association it will aid in the understanding of Dr. Anderson's letter to supply some background.

About two years ago a committee was instructed by the Council of the Canadian Medical Association to make a revision of the Constitution and By-Laws. On the completion of this task the report was considered by the Executive, and after many amendments was finally approved at the meeting of Council last June. The new Constitution and By-Laws are now in operation. If the new is compared with the old it will be noted that the Provincial associations elect eighteen more representatives this year to the General Council than before; that the personnel of the Executive has been increased from seventeen to twenty; and that representation on this committee from all the Provincial associations has been assured by the By-Laws instead of being left to courtesy as before. In other words the aim has been to give the Provincial Associations a larger voice in the affairs of the Canadian Medical Association, and this quite apart from the idea of any closer union between them.

While the Constitution and By-Laws were being revised a movement began with the Manitoba Medical Association, looking toward a closer relation between the Provincial Associations and the Canadian Medical Association. The idea spread to other Provinces and gathered force. Approval was expressed in many Provinces and Federation became a live issue. To meet the situation an enabling clause was inserted in Article V. of the Constitution giving a Provincial Association the option of federation with the Canadian Medical Association if it so desired. Only two fundamental provisions were made, *viz.*, that all the members of the federating association should be members of the Canadian Medical Association, and that they should be entitled to all the rights and privileges of membership.

It would have been in keeping with the original conception of Federation to look for a union which would include all of the Provincial Associations at one and the same time. However, after considerable study it was realized that this could not be expected, and the "All or None" plan had to be replaced by a plan which would enable a Provincial organization to make its own decision without waiting for the others. Events moved so rapidly that it became necessary to provide special Constitution and By-Laws applicable to Divisions, since at least one Provincial organization was ready to take advantage of the enabling clause in the Constitution. It is this modified Constitution and By-Laws which is referred to by Dr. Anderson in his letter.

It is not the intention in this reply to deal with the desirability or otherwise of any plan of federation, or with the relation of the Ontario Medical Association thereto, or even with the question as to how Provincial organizations should collect their fees, although these matters are all discussed by Dr. Anderson. The purpose of this letter is simply to make some comment on his interpretation of the modified Constitution and By-Laws.

1. Dr. Anderson makes the following reference, although not by name, to the annual meeting of Council (called General Council in the new Constitution and By-Laws):— "The annual meetings of the Canadian Medical Association are really meetings of its executive body with one of the nine provincial associations, at which meetings there is present only a sprinkling of the membership of the eight other provincial associations."

What are the facts? The Council is and has been the governing body of the Canadian Medical Association for years. Its total membership in the past has been approximately 125. This figure is increased by the new Constitution and therefore it may be expected that there will be some increase in attendance. It is not a paper organization. Its sessions extend over a period of two full days and its agenda cover the whole range of the Association's activities, including the Executive Committee's report. The new Constitution should give elected representatives of the Provincial organizations a balance of power at the meetings. But what about the actual attendance at these meetings? The record of the past few years will give some idea of what may be expected in the future. We find that in the last six years the Council has met in widely separated centres. The actual attendance as determined by roll call was as follows:—

Place of Annual Meeting	*Date of meeting*	*Number present*
Winnipeg	August 22, 1930	72
Vancouver	June 22, 1931	58
Toronto	June 20, 1932	84
Saint John	June 19, 1933	74
Calgary	June 18, 1934	67
Atlantic City	June 10, 1935	63

As the representation on Council from each Province is limited it is obvious that the members come from far as well as near.

2. Dr. Anderson states that "under the proposed Constitution the Executive committee is in a large measure permanent and self-perpetuating".

What have the By-Laws to say about this? At the annual meeting of the General Council a Nominating committee of fifteen is appointed by ballot, and it must have at least one member from every Province represented at the session.

At a later session of the General Council the Nominating committee presents nominations for representatives from the nine Provincial organizations to the Executive committee. Other nominations may then be received from the floor of General Council, after which elections are carried out by ballot. In this way 13 members are selected. The President, President-Elect, Chairman of General Council, Honorary Treasurer, Editor of the *Journal*, and Secretary are ex-officio members. Provision is made for one more ex-officio member, *viz.*, the Managing Editor of the *Journal*, but at the present time this office is held by the Honorary Treasurer. While this method of election applies in a general way to both Provincial Branches and Divisions, the latter have the privilege of selecting their own representatives to the Executive Committee. It is true that the final step in the election is taken by the General Council, but the rights of the Divisions are so carefully safe-guarded by the By-Laws that their candidates are sure of election.

To summarize the method of electing the Executive committee:— Approximately 70 members (average attendance in last 6 years) of General Council, the majority of whom are selected by nine Provincial organizations, elect 17 of the 20 members of the Executive committee. Can it be fairly said that this committee is "in a large measure permanent and self-perpetuating"?

3. Dr. Anderson states that "In the intervals between meetings a *quorum* (5) of the executive of the Canadian Medical Association functions independently of any general control whatever, and yet assumes to speak and act for the organized medical profession of Canada."

While the future is always somewhat uncertain it is to be hoped that the attendance at the meetings of the Executive Committee will never dwindle down to the official quorum of five. If that time ever comes the Canadian Medical Association will cease to function as a national organization. But perhaps Dr. Anderson is looking backward instead of forward. If so, let us follow him. In the last six years the Executive Committee has met twelve times *between* annual meetings. On only one occasion was the attendance as low as eleven. The average attendance for these meetings was between thirteen and fourteen. Generally, at least seven out of the nine Provinces were represented. With the progress of the Canadian Medical Association the business to be transacted between annual meetings has increased rapidly, and recently it has been found necessary for the Executive to hold a two-day session. It is scarcely necessary to say that the Executive Committee is responsible to General Council. So much for the *quorum*.

4. Dr. Anderson's practised eye has discovered in Chapter VIII. of the By-Laws two Sections which, on paper at least, appear to give the committees too much power. I am inclined to think he is right, although it would be a rash committee which would interfere in the affairs of a Provincial organization. The intention of the Constitution and By-Laws is perfectly clear. A "By-Law is defined as "a rule or law *subordinate* to a Constitution". Article XIV. of the Constitution refers specifically to provincial autonomy. It enunciates a basic principle to which all By-Laws are subordinate. Dr. Anderson did not quote Article XIV. of the Constitution in full, but here it is:

"No provision of the Constitution or By-Laws herein set forth shall interfere with the status of a Division as a Provincial organization. As a provincial body, it shall have complete control of its own affairs."

5. Dr. Anderson is quite right in insisting that the question of Federation requires careful study on the part of the Provincial associations. It is for these bodies to decide whether they can or cannot accept the plan set forth in the modified Constitution and By-Laws. The Canadian Medical Association did not originate the movement, and has not tried to bring pressure to bear on the Provincial associations in the matter. A new situation has confronted the Canadian Medical Association and it has endeavoured to meet it in an adequate way.

GEO. S. YOUNG

Toronto, May 1, 1936.

CLINICAL OBSERVATIONS WITH INSULIN PROTAMINE COMPOUND.—R. G. Sprague, B. B. Blum, A. E. Osterberg, E. J. Kepler and R. M. Wilder find that the immediate effect of insulin-P (insulin protamine compound) is much less than that of insulin-R (regular insulin). When the former is used alone, and given as a single dose before breakfast, the meals of the first few days provoke glycosuria, but when the dose is properly adjusted the level of the blood sugar on successive mornings decreases progressively and the elevating effect of meals diminishes until, by the end of from four to six days, a normal level of blood sugar may be attained even in cases of severest diabetes. Supplementing insulin-P with small doses of insulin-R will shorten the period of obtaining control. Insulin-R should not be mixed in the same syringe or injected into the same site with insulin-P. It has not been necessary to continue the supplementary use of insulin-R after the first few days in the milder cases, but probably in many cases such supplementary use of insulin-R will be desirable, especially in emergencies. Until more experience has been obtained is would appear that insulin-R will be the insulin of choice when quick action is desirable, as in the treatment of acidosis. Although insulin-P, in many cases, makes possible effective management of diabetes with only one administration of insulin a day, and with less insistence on rigid control of the diet, its careless use or disregard of the diet is attended with danger.—*J. Am. M. Ass.*, 1936, **106:** 1701.

Medical Societies

The Calgary Medical Society

The annual meeting of the Calgary Medical Society was held on April 14, 1936. The following officers were elected for the 1936-1937 session: *President,* Dr. A. J. Fisher; *Vice-president,* Dr. H. N. Jennings; *Secretary,* Dr. A. I. Danks; *Treasurer,* Dr. Morley Cody; *Librarian,* Dr. George Learmonth; *Executive Committee:* Drs. J. A. Reid, A. E. Shore, F. Fish.

Dr. John Fyfe, of the University of Alberta, gave a most interesting address to the members on "The management of severe hyperthyroidism".

G. E. LEARMONTH

The Montreal Physiological Society

At a meeting of this Society, held on March 16th, the following papers were read, (given here in abstract).

S. G. ROSS, H. TAIT MALLOY AND T. R. WAUGH, Department of Physiology, McGill University—Bile Pigment Metabolism and Excretion in Icterus Neonatorum.

A study of bile-pigment excretion in the stools and urine of a series of new-born infants was made. The period studied covered the first seven days of life. Secondly, in a series of infants, on the fifth and sixth day of life, the blood was examined for hæmoglobin concentration, corpuscular volume, van den Bergh reaction, and the urine, for bilirubin excretion. The infants were clinically divided into jaundiced and non-jaundiced. The findings are as follows.

In the 14 patients with jaundice, the average daily excretion of urobilin in the stools was distinctly lower than in the 16 non-jaundiced cases. There was comparatively little difference in the excretion of bilirubin in the stools of the two groups. The average combined excretion of urobilin and bilirubin in the stools of the patients with jaundice was definitely lower than in the patients without jaundice. The excretion of urobilin in the urine of the two groups (jaundiced and non-jaundiced) was essentially equal. The excretion of bilirubin in the urine of the jaundiced patients was always present, whereas in the patients without jaundice it was absent in all except four. In the second group, where the blood and urine were studied concurrently on the fifth or sixth day of life (63 cases of whom 22 were jaundiced and 41 not jaundiced), the hæmoglobin concentration and corpuscular volume showed only slight differences in the two groups. In all cases the direct prompt van den Bergh reaction was negative, while the delayed direct was positive in all cases. In the jaundiced cases the indirect reaction averaged 10.1 units, whereas in the non-jaundiced cases it averaged 4.4 units. Bilirubin was present in the urine of all the jaundiced cases except 4, whereas it was absent in the urine of all the non-jaundiced cases except 3. In these three cases the indirect reaction in the blood showed levels of 10, 13 and 14 units. One feels, therefore, that in these cases the clinical diagnosis was at fault.

The findings show that this type of jaundice is dependent upon the height of the bilirubinæmia in the blood serum, as measured by the indirect van den Bergh reaction. The close agreement in the values of hæmoglobin and corpuscular volume in the two groups is evidence that the jaundice is not due to excessive hæmolysis alone. This, of course, depends upon the assumption that the blood volume and the hæmoglobin concentration at birth of these two groups is the same. The reduced excretion of bile pigments in the stools of the jaundiced patients suggests that the excretion of the excess of bile pigment in the blood is interfered with, either by obstruction in the bile channels or by functional inability of the liver cells to excrete bile pigment. The constant presence of bilirubin in the urine is usually considered as pointing to an obstructive jaundice. On the other hand, the absence of the prompt van den Bergh reaction in the serum of the jaundiced patients definitely rules out a purely obstructive type of jaundice. If so, this lends support to the view that the liver cells are temporarily unable to excrete the great excess of bile pigment, and as a result jaundice develops.

JOHN TAIT AND N. J. BERRILL (by invitation), Department of Physiology, McGill University, Montreal—Synchronism of Heart and Respiratory Beat in Limulus.

On *a priori* grounds it was conjectured that the beat of the respiratory appendages of Limulus may synchronize with the heart beat. When arrangements are made to observe both simultaneously it transpires that when the respiratory appendages do move they do so in precise *tempo* with the heart beats. As the individual leaves of the gill-books likewise increase in volume with each opening movement of the respiratory appendages this rhythmic volume change is due presumably to rhythmic changes of blood pressure. Because the heart of this arachnid thus constitutes an essential part of its "outer motor mechanism" of respiration,, one can better understand (1) the reason for the neurogenic control of the Limulus heart, as discovered by Carlson; (2) Plateau's failure to discover externally visible respiratory movements in scorpions and spiders; (3) the curious retention of the "book" form of respiratory organs in terrestrial arachnids.

I. M. RABINOWITCH, Department of Metabolism, Montreal General Hospital — Metabolic Study of the Eskimos in the Eastern Canadian Arctic. These observations were detailed at length in the May issue of the *Journal,* p. 487. (ED.)

At a meeting of this Society held on April 20th, the following important paper was read (given here in abstract).

HANS SELYE, Department of Biochemistry, McGill University, Montreal—The Alarm Reaction.

Experiments on the rat show that if the organism is seriously injured by acute, non-specific influences, such as exposure to cold (+1 to +7° C.), surgical injuries (handling of intestines), spinal shock (transcission of spinal cord), or intoxications with sublethal doses of various drugs (atropine, morphine, vasopressin, etc.), a typical syndrome appears. This develops in two stages. During the first stage, 6 to 24 hours after the initial injury, one observes rapid involution of the thymus and lymph glands, œdema formation with accumulation of transudates in the pleura and peritoneum, decrease of muscular tone, drop of body temperature, formation of acute ulcers in the digestive tract (particularly in the stomach, small intestine and appendix), and sometimes hyperæmia of the skin, loss of reflex irritability, exophthalmos, increased tear secretion, and salivation. During the second stage, beginning 24 to 48 hours after the initial injury, the adrenal cortex enlarges and the chromaffin cells of the medulla, which began to show vacuolization during the first stage, become still more distended with vacuoles. General body growth ceases and the gonads become atrophic. Degranulated basophiles appear in the pituitary, and the thyroid shows a tendency towards hyperplasia. In lactating animals the secretion of milk is discontinued. There seems to be a shift in the hormone production of the pituitary leading to cessation of the production of growth and sex hormones and prolactin in favour of increased elaboration of adrenotropic and thyrotropic principles, which are more urgently needed in such conditions of emergency. We consider this syndrome to be the expression of a general alarm of the organism when suddenly confronted with a critical situation. For the sake of brevity, we shall refer to this syndrome in general as "the alarm reaction" (A.R.), and in particular to its first stage as "A.R.1" and its second stage as "A.R.2". It seemed difficult at first to understand why the organism reacts to such different stimuli in an identical manner. A comparison of the symptoms of the A.R.1 with those of histamine poisoning and surgical or anaphylactic shock make it likely that the liberation of large quantities of histamine or similar substances from tissues is the common factor responsible for the similarity in the symptomatology of the A.R.1, whatever stimulus elicits it. If this supposition be correct, surgical shock would be a special form of the A.R.1 in which substances with histamine-like effect are liberated mechanically from the tissues, differing from other types of the A.R.1 only in that the latter group liberate similar substances by other means—(chemical [drugs]; physical [cold, x-rays, ultra-violet rays]; or nervous stimuli [spinal shock]). This interpretation is substantiated by the following observations. Adrenalectomy markedly sensitizes the rat both to histamine and to stimuli causing the A.R.1. A single dose of 20 mg. of histamine intraperitoneally evokes the picture of the A.R.1 (including gastric and intestinal ulcers), with the exception of the atrophy of lymphoid tissue, in the adrenalectomized rat within 30 minutes to 1 hour, *i.e.*, more rapidly than any other stimulus studied. In the normal rat at least 100 mg. have to be given to obtain similar results. The A.R.1 evoked by drugs or exposure to cold will often cause pulmonary emphysema in the guinea pig (the typical response to histamine in this species) but not in the rat. Hunger, cold, hæmorrhage (all known to sensitize the organism to histamine) also facilitate the production of the A.R.1 by any non-specific damaging stimulus, while Ringer transfusion protects against both histamine and the stimuli causing the A.R. Cannon has shown that surgical shock is greatly dependent on histamine liberated from the protein of crushed tissues. It seems possible that in the case of alarm reactions caused by stimuli other than traumatic injuries histamine liberated from the various organs which lose weight in this condition (particularly the rapidly involuting thymico-lymphatic apparatus) plays an important part. In the light of our findings we should be inclined to interpret the important discovery made by Dodds and Noble that posterior pituitary extracts produce gastric ulcers as an indirect effect, acting *via* the liberation of histamine, possibly in the gastric mucosa itself. While adrenalectomy prevents thymus- and lymph-gland involution following stimuli causing an alarm reaction in the normals it greatly sensitizes the organism to the other symptoms of the A.R.1 (œdema, gastric and intestinal ulcers); at the same time it decreases the resistance of the organism against drugs and injuries. It is possible that the adrenal exerts its protective effect against drugs and injuries and its effect on water metabolism by way of its action on the lymphatic system. After some time drugs lose the power to produce an alarm reaction, in spite of continued daily administration of a dose which evokes the reaction in animals not pre-treated. Our observations lead us to believe that the A.R. may represent a general defense reaction of the organism, comparable in a way with fever, inflammation, the formation of antibodies and the processes occurring during drug habituation.

DONALD J. BOWIE, Department of Histology and Embryology, McGill University—The Distribution of Peptic and Mucous Cells in the Gastric Mucosa.

The difficulty of preserving and staining pepsinogen granules in peptic cells has been overcome by developing new methods of technique (Bowie, *Anat. Rec.*, Feb., 1936). The method is very suitable for the study of human gastric mucosa removed at operation.

In the cat there are only a few peptic cells in the "fundic" glands of mucosa taken from the region near the œsophagus. The maximal number of peptic cells is found in the region near the middle of the greater curvature. Proceeding toward the pyloric portion these cells gradually diminish in number and disappear at the pyloric junction. In this animal the mucous neck cells are present in the deeper parts of the "fundic" glands as well as in the neck region. Near the pyloric junction this type of mucous cell may compose practically the whole of the gland. The staining reaction of the mucus in the neck cells and those deeper in the "fundic" glands is decidedly different from the mucus in the cells of the pyloric glands. After appropriate fixation the peptic cells show a positive reaction to stains for mucus. This may possibly indicate the source of the "dissolved" mucus which Webster and Komarov have found in gastric juice.

The method of staining the pepsinogen granules has been used to show (1) that histamine does not stimulate peptic cells; (2) that adrenalin and splanchnic stimulation likewise has no effect on these cells, and (3) that strong vagal stimulation causes a marked discharge of pepsinogen granules from peptic cells.

J. S. L. BROWNE

The Saint John Medical Society

The Saint John Medical Society was entertained at the Saint John Tuberculosis Hospital last month, when Dr. Norman Bethune, of Montreal, gave an address on "Surgery of the chest". The attendance was large, and many of Dr. Bethune's statements were surprising to a good number of his listeners. The advance in chest surgery has, no doubt, been startling, but according to Dr. Bethune further advances will be shortly forthcoming. Those attending the meeting were afterwards entertained at dinner by Dr. R. J. Collins.

At the regular monthly meeting of the Saint John Medical Society, Dr. R. J. Collins, Medical Superintendent of the Saint John Tuberculosis Hospital, presented an exhaustive statistical report of cases of tuberculosis treated at the Saint John Tuberculosis Hospital over a period of fifteen years. This included all cases which had had surgical treatment of chest conditions. In this group pneumothorax, phrenicotomy and thoracoplasty were discussed. Dr. Collins compared the results in this series with results obtained elsewhere. This group covered 289 patients in which pneumothorax was attempted, 103 cases of phrenicotomy, and 103 cases of thoracoplasty. It was stressed in the report that all of these cases originating in the Saint John Tuberculosis Hospital had been treated surgically in the same hospital. Discussion of the paper was in the hands of Dr. H. A. Farris, Dr. R. A. H. Mackeen, and others.

Post-Graduate Courses

Children's Memorial Hospital, Montreal

An intensive post-graduate course in pædiatrics is to be offered by the staff of the Children's Memorial Hospital in Montreal for one week beginning Monday, September 14, 1936. An interesting practical and instructive schedule has been arranged for every day of the week, during which there will be lectures and demonstrations in the more important phases of pædiatric work including the special branches of surgery, orthopædics, otolaryngology, etc. Admission to the course will be limited; a nominal fee will be charged. Those interested are requested to communicate with Dr. H. S. Mitchell, Superintendent, Children's Memorial Hospital, Montreal.

University Notes

University of Pennsylvania

The Cancer Research Laboratories of the Graduate School of Medicine of the University of Pennsylvania have been transferred to the Franklin Institute and will be continued under the name of Biochemical Research Foundation. Dr. Ellice McDonald will continue as director, with forty-two research workers on the staff. Thomas S. Gates, president of the University, explained in his annual report that the change was made because Irénée du Pont, who provided funds for the research, could not agree with the University's policy on the question of rewards for scientific research. Last year the University formally adopted the policy that all discoveries should be made available to the public without any profits accruing to the individuals or the institution responsible. Mr. du Pont is said to have expressed the opinion that greater progress would be made if some

definite form of financial reward was held forth. He also felt it would be well for the foundation to patent discoveries with the intent of using profits or income to pay for further research. Mr. du Pont established the cancer research department anonymously in 1927.—*The Diplomate*, 1936, **8**: 22.

University of Toronto

Dr. J. G. FitzGerald, Dean of the Faculty of Medicine, Director of the School of Hygiene and of the Connaught Laboratories, University of Toronto, has been invited by the Rockefeller Foundation to make a study of the methods at present employed in the teaching of Preventive Medicine to undergraduates in medical schools. It is anticipated that the study will occupy a period of one year, commencing September 15, 1936. Dr. Charles Edward Smith, of the Stanford University Medical School, San Francisco, will assist in the undertaking. University Medical Schools in the United States and Canada, the British Isles, and in European countries will be visited in the course of the survey.

Dr. FitzGerald is to resign as Dean of the Faculty of Medicine, University of Toronto, June 30th next. He will be given leave of absence by the Governors of the University for the necessary period, and will, it is expected, return to the University of Toronto in September, 1937, as Director of the School of Hygiene and of Connaught Laboratories.

Dr. E. Stanley Ryerson, Assistant Dean and Secretary of the Faculty of Medicine, University of Toronto, recently spent two weeks in the western provinces, visiting the Universities of Alberta, Saskatchewan and Manitoba. He accompanied Dr. W. D. Cutter, Secretary of the American Medical Association, in the Survey of Medical Colleges of the United States and Canada that has been proceeding for the last two years under the auspices of the American Medical Association and the Association of American Medical Colleges.

Dr. Ryerson was entertained by the graduates in medicine at Edmonton and Winnipeg, whom he found very loyal to their Alma Mater and greatly interested in the various developments that have occurred in the training of the students since their time, as well as in the whereabouts of many of their old professors. Dr. Ryerson also addressed the Canadian Club at Edmonton on "The doctor past, present and future." Dr. Ryerson was much impressed by the cordial reception and full cooperation given to Dr. Cutter and himself by the administrative officers and heads of departments of the three institutions visited.

Special Correspondence

The London Letter

(From our own correspondent)

During the last few years this nation has become increasingly keen on the cultivation of better physical development, and various aspects of this problem have been mentioned from time to time in these letters, not the least important of which being the danger of "getting the body on the brain". The British Medical Association set up a special committee last year, largely as the result of a hint from the Minister of Health, "to consider and report upon the necessity for the cultivation of the physical development of the civil population and the methods to be pursued for this object". The report is now available and is a very valuable document. Beginning with a discussion of the importance of exercise, fresh air, sunshine, diet and clothing, the report goes on to survey the place of physical education in the schools. This reveals that neither equipment nor instruction is at all satisfactory, and one of the first recommendations is to provide properly equipped gymnasia, together with changing-rooms and shower baths. The committee deprecates the way in which organized games are far too often regarded, especially by boys, as much more important than proper physical attendance at a gymnasium. Swimming receives due attention, and the doctor is urged to play a much more intimate part in supervising the physical educative side of school life. Whether voluntary organizations could cope with the physical training of boys and girls after leaving school depends upon what can be organized in the future. Clearly, there must be some great extension of existing facilities, and an interesting suggestion also included in the report is to the effect that instruction in elementary physiology and hygiene should be regarded as an essential part of the program of physical education.

While the medical profession is debarred by ethical standards from any form of advertising, there is no restriction whatever in this country for the advertisements of remedies for any form of disease, with the one exception of venereal disease. It is clear to any thinking person that to offer a positive cure for cancer, diabetes, and certain other disorders may well lead to an unfortunate delay before the patient seeks and secures proper medical advice, and it is particularly important that some disorders come under treatment as early as possible. Ever since the Select Committee of the House of Commons published its report on the Patent Medicines in 1914, there has been available incontrovertible evidence of the widespread evils extending in this country. There are many vested interests, however, including all those who make money out of advertisements, and it has been very difficult to

see how best the matter can be tackled. There was presented to the House of Commons last month, however, a Bill which had the backing of newspapers, advertising agents, pharmaceutical authorities, and the medical profession, which, with this large measure of agreement, did appear to get over all the difficulties. However, there was another attraction in the shape of the Grand National, and out of six hundred or more members of Parliament less than forty were available to debate the measure which had taken years of patient labour. As a result the Bill had to be dropped, and no progress is possible at the moment unless the Minister of Health will take the matter up. It is now over twenty years since the Select Committee produced its report, and although it is well recognized that legislation takes time it would appear that the so-called latent period might well be brought to an end. Meanwhile the average young doctor prescribes more and more proprietary preparations, so that he too may well become an opponent of any legislation to regularize this sort of business. After all, if pharmalogical education is to be carried on by circulars received through the post, any ban on advertising might interfere with this method of acquiring knowledge. Perhaps before the public can be persuaded that quack advertising is bad, the medical profession might adopt a self-denying ordinance in this respect.

Better fortune is anticipated for the new Midwives Bill which the Minister of Health has presented to Parliament for discussion at an early date. It will be remembered that one of the schemes for improving the maternity services of the nation was to organize a proper supply of salaried midwives under the health authorities in every district. The general principle behind the Bill secures that every maternity patient shall be nursed by a qualified midwife with prohibition of unqualified persons attending maternity cases for gain and the establishment by local authorities of a definite salaried service, so that midwives no longer have to eke out in many instances a precarious existence. Each authority has to fix a scale of fees for the services of midwives, and such fees may definitely be recovered according to the circumstances of the family. A very excellent proposal in the Bill is the suggestion that midwives may have to attend post-graduate courses, and the view is expressed, unofficially, that these must certainly include better instruction in the care of the newborn infant. While it is perfectly true that the maternal mortality rate has caused great alarm, it is not always realized that the neo-natal death rate is far too high in view of the great advance made in bringing down the total infant mortality rate during the last thirty years. It is possible that the total course of training for midwives will be much increased in length, and when that happens the pædiatrician hopes to get a more definite share of the period allocated to him for special instruction.

ALAN MONCRIEFF.

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The Edinburgh Letter

(From our own correspondent)

In the current issue of *The Student*, the undergraduate magazine of Edinburgh University, there appears an article by Dr. Chalmers Watson, a former teacher of clinical medicine, on the subject of the proposed reform of the medical curriculum. The case for reform he says is overwhelmingly strong and urgent. When the defects of the present curriculum were first discussed at a meeting of the Edinburgh Medico-Sociological Club some years ago there was found to be virtually complete agreement among all those who took part in the discussion—professors, extra-mural teachers, and others interested—as to the need for drastic reforms. When, however, the subject was more intimately approached, it was revealed that the field open to reform became more and more restricted. Recurring speakers, while freely recognizing the existence of grave defects or excesses in the teaching of other subjects, were definitely inclined to regard their own subject as an outstanding exception. The primary objective in a medical curriculum—an efficient medical education adapted to meet the needs of the general practitioner of the future—was, to a great extent, quite lost sight of. The real explanation of the anomaly, says Dr. Watson, lies in the undue prevalence of an excess of caution based on a great fear of the results which would follow such changes as were considered necessary. He points out, however, that the case for reform has been greatly strengthened by three authoritative pronouncements. These are lengthy reports issued by leading representatives of the medical section of the League of Nations which reveal a note of comparative hopelessness of getting the medical authorities in power to take appropriate action; the British Medical Association's interim report, with recommendations which have made a wide appeal to the profession, which is now before the General Medical Council; and the joint report of the Royal College of Physicians and of Surgeons in England, and the Universities of Oxford and Cambridge, whose findings were, in general, in substantial agreement with those of the British Medical Association. The essential feature in the recommendation of the Association is that the present curriculum has become needlessly and unwisely specialized, and fails to meet the needs of the general practitioner of the future.

The present system of the education of the general public is also a matter which is the subject of considerable discussion in these days. Dr. David Yellowlees, of Glasgow, recently addressed a public meeting in Edinburgh convened by the Edinburgh Committee for Mental Welfare. He described the present Leaving Certificate as a real menace. There were many cases he said where a deep feeling of inferiority was hammered into a child, especially during the period of adolescence when the stress of education was becoming more severe and the average standard was higher, by nagging parents and teachers who pushed him harder than he could really go. He suggested that the present system was not flexible enough to provide for children who kept up sufficiently well in the earlier years but found advanced work too much for them, though they were perfectly fitted to do excellently in practical life. Such children however were too often spoiled even for that by their conviction of failure in what they were led to believe was the most important business of their lives at that stage—the passing of examinations. Even for brainy children Dr. Yellowlees declared the critical fact that it was just during the difficult years of puberty that educational, or rather examinational, considerations had in our society special prominence and importance. From the biological and psychological point of view the important thing between the ages of 12 and 18 was that the child should pass comfortably and successfully through the changes of puberty, but from the educational and economic point of view the important consideration during those years was that the child should successfully pass the Leaving Certificate examinations. These two demands said Dr. Yellowlees were not always compatible, and for the sensitive child who had been taught to take himself and his work too seriously they often gave rise to grave trouble. To his mind the present system and the Leaving Certificate examination was a real menace, and if educational authorities were as keen on psychology as they sometimes professed to be there ought to be some heart-searching on the matter and some action. He believed however that educationists were all alike hindered by the traditional conservatism in high places and could not apply psychological knowledge to the whole problem. That would be a very large order but it would have to be done some day.

In connection with the subject of physical education to which I referred in my letter last month the Committee appointed by the British Medical Association to investigate the position of physical training both among children and adults has now issued its report. This has been published in pamphlet form by the Association. The whole matter is very thoroughly dealt with, and if the recommendations made are acted upon there is no doubt that the general standard of physical efficiency in the country would be definitely raised.

It has been intimated that Sir Robert Muir, Professor of Pathology in the University of Glasgow, will resign his Chair in September next. Sir Robert has a great reputation as a teacher and as a brilliant and original investigator of the problems of pathology, bacteriology and immunology. Many of his old pupils have been called on to fill Chairs of Pathology in all parts of the world. Professor T. K. Monro, of the Chair of the Practice of Medicine in the University of Glasgow, is also to retire at the end of June. Professor Monro was appointed in 1913. He has had a very distinguished career and has held various appointments in the hospitals of Glasgow. He has contributed largely to medical literature.

R. W. CRAIG.

7 Drumsheugh Gardens,
Edinburgh.

Letters, Notes and Queries

Resolution from the Canadian Red Cross Society

To the General Secretary:

At the recent meeting of the Central Council of the Canadian Red Cross Society the following resolution was unanimously adopted:—

"The Central Council of the Canadian Red Cross Society wishes to convey to the medical profession of Canada its sincere appreciation and thanks for the outstanding gratuitous services which the members of the profession have rendered in the cause of humanity through the agency of the Red Cross in all parts of the Dominion."

J. L. BIGGAR, M.D.,
National Commissioner,
Canadian Red Cross Society.

Toronto,
April 16, 1936.

Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

To the Caliph Haroun al Raschid on his undertaking a pilgrimage to Mecca.

Religion's gems can ne'er adorn
The flimsy robe by pleasure worn;
Its feeble texture soon would tear,
And give those jewels to the air.

Thrice happy they who seek th'abode
Of peace and pleasure in their God!
Who spurn the world, its joys despise,
And grasp at bliss beyond the skies.

—Ibrahim ben Adham.

Topics of Current Interest

The Use of Iodized Salt in Canada

In a letter dated July, 1929, from Dr. V. E. Henderson, at that time Chairman of the Committee on Pharmacy of the Canadian Medical Association, the C.M.A. supported a resolution in regard to iodized salt forwarded to the National Research Council by the Canadian Chemical Association. In that resolution the attention of the Council was called to the indiscriminate distribution of iodized salt in Canada and to some uncertainty then existing as to whether such distribution was entirely beneficial to public health. It was suggested that the National Research Council should appoint a committee "to investigate the use, optimum content and control of iodized salt in Canada". As secretary of the committee formed by the National Research Council to deal with this question, I have been directed to advise you as to the action taken. For the sake of brevity the information is presented in tabular form.

ACTION TAKEN BY THE NATIONAL RESEARCH COUNCIL IN REGARD TO IODIZED SALT

1. A conference on iodized salt was called for a preliminary discussion of this subject.
2. Acting on the recommendation of the conference an Associate Committee on Iodized Salt was formed to consider the whole question of the use of iodized salt, and to advise the Council regarding action to be taken in relation thereto.
3. A survey was made of the prevalence of goitre and the approximate distribution of iodized salt in Canada.
4. A study was made of the literature and a report was prepared by a member of the Council's staff on "The Use of Iodine as a Preventive of Goitre".
5. Information was obtained in regard to the iodine content of well water in Alberta from Dr. O. J. Walker, Associate Professor of Chemistry at the University of Alberta, who analyzed a large number of samples from different parts of that province.
6. The manufacturers of iodized salt were consulted regarding methods of mixing potassium iodide with salt and recommendations were made with a view to securing more uniform distribution and rendering subsequent segregation more difficult.
7. The Department of Pensions and National Health was consulted in regard to the uniformity of the iodized salt on the market. In a survey undertaken by that department, it was found (*a*) that the iodine content of iodized salt varied greatly, and (*b*) that the analyses of the department and of the manufacturers did not check. Recommendations were made to the department in regard to the standardization of the method of analysis for iodine and eventually agreement in analyses resulted. A recent report of the department states that samples of iodized salt obtained on the market now fall reasonably well within the limits of iodine content claimed.

The Associate Committee on Iodized Salt, after careful consideration of the proportion of potassium iodide in iodized salt sold to the public in different countries, the probable iodine requirements of the individual, the magnitude of the ordinary therapeutic dose of iodine and the opinions of recognized authorities on this subject, reached the following tentative conclusions:

1. That iodine is required by all animals, including man, and especially those in the pregnant condition.
2. That since the iodine content of food and drinking water varies greatly throughout Canada the necessity for the administration of iodine also varies in different parts of the country.
3. That the method of administering iodine as sodium iodide or potassium iodide in salt is satisfactory.
4. That the proportion of potassium iodide now used in iodized salt in Canada, one part in 10,000, is unnecessarily high. It is considered that one part of sodium or potassium iodide in 200,000 would be sufficient, and that one part in 100,000 would be satisfactory as a maximum.
5. That the addition of iodides to the soil may be expected to increase the iodide content of plant foods grown thereon, but this procedure is considered to have no special advantage over the direct administration of iodine in iodized salt and is regarded as very wasteful.
6. That the widespread sale of endocrine preparations containing thyroid is inadvisable from the standpoint of the health of the community, except under a doctor's prescription, and that otherwise the sale of these preparations for the treatment of goitre or obesity cases should not be permitted.

The National Research Council at a recent meeting reviewed the progress made to date by the Associate Committee on Iodized Salt. It appeared that the chief objects for which the committee was formed had been attained and that more reliable information on the optimum iodine content of iodized salt could not readily be obtained without a protracted and very costly research. The committee was accordingly disbanded.—F. E. Lathe, Secretary, Associate Committee on Iodized Salt.

Medicodentally Speaking!

If I had a son who wished to practice dentistry, I should insist that he complete, as a minimum, the premedical—not the predental—requirements.

I should explain to him that the fundamental sciences of anatomy, physiology, chemistry, and

pharmocology are as applicable to the treatment of the teeth and jaw bones as to the remaining parts.

I should advise him to complete the first two years of the medical course before beginning the study of dentistry.

I should attempt to save him from the embarrassment of reading on the top of his final examination in anatomy, "Dental students answer the first eight questions, medical students answer ten".

I should advise him to secure his A.B., B.M., or M.D., but should not insist on this, as degrees do not necessarily denote erudition or culture.

I should warn him about the evaluation of his credits for advanced work or degrees in the future.

I should emphasize that correct diagnosis is the supreme achievement in health service.

I should remind him that surgical judgment is greater than technique.

I should expect him to have greater knowledge of preventive dentistry than a member of any other professional group.

I should expect him to be able to discuss all phases of bone phenomena with the orthopædic surgeon and possibly lead the discussion.

I should point out that he should approach his research problems from the standpoint of pure science.

I should like him to feel, in so far as his personal preparation is concerned, that he is able to take his equal place with those earnest workers engaged in the advancement of science. —Hugh W. MacMillan. Excerpts from address at the Eleventh Annual Fall Clinic of the Montreal Dental Club, *J. Canad. Dent. Ass.*, December, 1935.

Abstracts from Current Literature

Medicine

Latent Adolescent Pulmonary Tuberculosis. Wingfield, R. C. and Macpherson, A. M. C., *Brit. M. J.*, 1936, **1**: 741.

A large proportion of tuberculosis in young adults is first diagnosed when the lesions are far advanced and when the results of the most expensive and prolonged treatment are seldom really satisfactory, since the danger of relapse is always great. The late diagnoses are undoubtedly due to the fact that pulmonary tuberculosis is during long periods of its activity a symptomless disease. The authors believe, from their experience of recently diagnosed adult cases, that the extensive lesions present were in many cases deposited during adolescence, with the accompaniment of slight, or unexplained, constitutional disturbance. The lesions remained unrecognized until they had spread extensively or were reactivated by some environmental factor. To test this theory, some 2,381 adolescents of both sexes, from 14 to 21, all actively working or at school, and considered healthy, had their chests x-rayed. The plates were then examined to pick up x-ray shadows which could be interpreted as indicating "pathological changes in the lung parenchyma, having the appearance which was compatible with, and usually associated with, tuberculous lesions of the adult type." Fifteen of the 2,381 plates were undoubtedly "positive", and of 18 additional abnormal films, 10 were "probably tuberculous", *i.e.*, an undoubted incidence of 0.65 per cent and a probable incidence of 1.08 per cent of latent pulmonary tuberculosis of the adult type. The actual incidence of clinical pulmonary tuberculosis in young adults from 21 to 35, is variously estimated as being about 0.75 per cent for males and 0.5 per cent for females. The x-ray positive adolescents were all working long hours at either school or work, and were subject to all the usual physiological stresses of adolescence. It is reasonable to assume then that a very definite proportion of the clinical tuberculosis of young adults will develop from this adolescent group of lesion-carriers.

The authors plead for the adoption of such methods as will detect these adolescent lesion-carriers while still in the latent stage. At this time it is comparatively easy to handle them so that they will never develop clinical disease; hence adult mortality will be reduced by whatever proportion (probably a large one) these adolescent lesion-carriers contribute to the adult clinical cases. Under present methods the young adult death-rate from tuberculosis is not declining. If this death rate could be made to decrease materially by the institution of even such expensive investigative methods as the above they would be well justified.

W. FORD CONNELL

Peptic Ulcer. A Study of the Disease before and after the Demonstrated Ulcer. Schnitker, M. A. and Evans, W. A., *New Eng. J. M.*, 1936, **214**: 198.

The actual ulceration is not the most important or significant manifestation of the disease. As cavitation is but one lesion in the course of pulmonary tuberculosis, so ulceration is but a part of the picture in this disease. Among 1,653 patients seen in the out-patient department of Peter Bent Brigham Hospital in whom peptic ulcer was suspected clinically there were 31 in whom one or more roentgenological examinations revealed no ulcer or ulcer deformity of the stomach or duodenum and in whom at a later date an ulcer was demonstrable. These cases are the basis of this study.

They fall into four groups. The first group of 16 patients consists of those in whom the first roentgenological studies were entirely negative so far as the stomach and duodenum

were concerned, and in whom a duodenal ulcer was demonstrated subsequently. The second group contains 2 patients in whom a gastric ulcer appeared. In the third group are 20 patients in whose case the evidence is in part surgical. In one, two exploratory laparotomies by experienced surgeons gave no evidence of ulcer, although the stomach and duodenum were carefully examined on both occasions; a duodenal ulcer was finally demonstrated roentgenologically four years after the last laparotomy. In the other case, four roentgen examinations over a period of five years failed to reveal a crater or the deformity of one, while the presence of a duodenal ulcer was later established by laparotomy.

The final group of 11 patients consists of those in whom the first barium studies were regarded as doubtful because of transient deformity or irritability of the duodenal cap. In these patients no crater or constant deformity could be made out in the initial examinations, although a typical duodenal ulcer was demonstrable at a later date. The evidence would indicate that the lesion present at the time of the early examination was a duodenitis.

The cases were studied to compare the findings before and after the demonstration of the ulcer. There were no appreciable changes in symptomatology with the presence of the ulcer. There appeared to be a high incidence of night pain, 17 of the 31 patients had this. Six of the patients had bleeding when no ulcer was demonstrable. Nine had gastric analyses before the ulcer appeared; in 4 of these the free acidity was high and in 1 no free acid was present after the test meal. The gastric analysis in these cases after the ulcer was present showed no appreciable difference in 7 of the cases; in one case there was more acid and in the other there was less.

A diagnosis of ulcer cannot be made from the presence of thickened rugæ alone. The average trend in about half the cases was slight but definite increase in the thickness of the rugæ up to the time of the demonstration of the ulcer. In two cases the rugæ were definitely less tortuous and thickened at the time of the ulcer than on previous films.

LILLIAN A. CHASE

Gastroscopic Observations in Neoplasm. Benedict, E. B., *New Eng. J. M.*, 1936, **214**: 563.

Since the invention in 1932 of the Wolf-Schindler flexible gastroscope the practice of gastroscopy has increased rapidly. The flexible gastroscope was first used on this continent in 1933 at the Massachusetts General Hospital, and is now used in a number of the larger clinics.

Fourteen cases are described in detail as to x-ray findings and gastroscopy. It is found that gastroscopy is a very helpful supplement to x-ray examination in diseases of the stomach. It is not offered as a substitute for the x-ray, since it is admitted that the latter is indispensable in the diagnosis of gastric conditions. Since œsophageal disease may be a contra-indication to gastroscopy, x-ray study of the œsophagus and cardiac orifice should always be carried out as a preliminary procedure. Patients with stomach complaints, even if vague and of short duration, should have early x-ray examination, followed in selected cases by gastroscopy, which is a valuable adjunct to x-ray in (1) making an early diagnosis of carcinoma; (2) in differentiating benign and malignant lesions; (3) in determining the location and extent of the lesion and (4) in excluding intragastric lesions.

LILLIAN A. CHASE

Uncomplicated Auricular Fibrillation and Auricular Flutter. Orgain, E. S., Wolff, L. and White, P. D., *Arch. Int. M.*, 1936, **57**: 493.

The authors are dealing with cases suffering from these two conditions, who have no other signs of heart disease, showing that they are not infrequent, and that their prognosis is usually good. These clinical entities are not seldom caused by extra cardiac factors, such as the toxic group, which includes infections, drugs, and chemical agents such as alcohol and tobacco, and the traumatic group, injuries, shock, nervous disturbances, reflex occurrences associated with abdominal conditions, cough, vomiting and some other agencies.

Forty-nine cases of auricular fibrillation and seven of auricular flutter are reported which showed no other evidence of heart trouble. Many of these patients have been observed over long periods of years and have been alive as long as 33 years after onset, many as long as 16-17 years when divided into groups according to whether the onset was before and after 40 years of age. There was not nearly as much difference in the subsequent history as one would expect. Only one of the 54 cases reported was due to hyperthyroidism. Quinidine was used in a great many cases, sometimes in very large doses, and was usually very successful in making the irregularity disappear.

It would seem that such cases can be described as functional.

P. M. MACDONNELL

Recurrence of Inoculation Malaria. Peterson, M. C., *J. Am. M. Ass.*, 1936, **106**: 775.

By the majority of practitioners the recurrence of inoculation malaria is entirely disregarded. Such an attitude, though excusable, is not justifiable. The present author reports on a series of 261 cases treated with inoculation malaria (tertian). In 14 cases the parasite was found in thin blood films from 6 to 150 weeks after subsidence of the fever. These

patients had received from 5.3 to 97 gms. of quinine sulphate by mouth. In 11 cases there was definite recurrence of the fever. The writer concludes that inoculation malaria differs in no respect from that transmitted by the mosquito. He forcibly suggests that repeated blood searches in malaria-treated cases having fever from any cause would reveal a number of unsuspected recurrences. It may even be said that inoculation malaria may be a factor in the spread of the disease.

G. N. PATERSON-SMYTH

Surgery

The Nicola Operation for Recurrent Dislocation of the Shoulder. Willard, D. P., *Ann. Surg.*, 1936, **103**: 438.

The author lists the various methods used for the repair of recurrent shoulder dislocation. Nicola's method impressed him because of its technical simplicity and the resulting functional efficiency. A step tenotomy of the long head of the biceps is done. A hole is drilled in the bicipital groove at the level of the lower border of the transverse humeral ligament through the humeral head, to emerge anteriorly to and above the centre of this structure. The upper part of the divided tendon is passed through this tunnel and sewn to the distal portion. A Velpeau bandage is worn for five days and then replaced by a sling. Passive extension and flexion of the shoulder and elbow are started at the end of the second week. More active movements are started at the end of three weeks. Elevation of the arm beyond the shoulder level is avoided for eight weeks. The end-results of 10 cases treated in this manner are reported. One patient had one recurrence of dislocation due to a major trauma. All returned to their former occupations.

STUART GORDON

Penetrating Wounds of the Brain. Pilcher, C., *Ann. Surg.*, 1936, **103**: 173.

The literature dealing with missiles in the brain is enormous, but is composed largely of reports on isolated unique cases and of very few accounts of any research investigation of the problem. Experience of the war crystallized a few of the principles of treatment, but there remain a number of debatable points. Pilcher has studied the effects in dogs of wounds of the brain caused by protruding foreign bodies (unsterile nail) and by deeply embedded foreign bodies (unsterile shot placed in brain by sterile operation). He found that if foreign bodies penetrate the ventricle and are allowed to remain protruding through the skin a fulminating, fatal infection of meninges, brain and ependyma invariably results. Removal of the protruding foreign body within 12 hours after its insertion greatly reduces the incidence of fatal infection. If the ventricle is not penetrated by the protruding foreign body the incidence of fatal infection is considerably reduced. Closure of the scalp over an inserted foreign body reduces the incidence of fatal infection and prolongs the survival time if infection develops. Deeply embedded foreign bodies which do not communicate with the skin or subarachnoid space do not cause fatal infection unless the ventricle has been traversed. In the presence of established superficial cerebral infection about protruding foreign bodies early adequate drainage reduces the mortality rate. Pilcher concludes with a few therapeutic suggestions:—

1. Foreign bodies in the brain which are in communication with the skin, the subarachnoid space, or the ventricular system should be removed at the earliest possible moment.
2. Deeply-embedded foreign bodies not falling in the category just mentioned should be removed only if local irritation or destructive symptoms are present.
3. If infection already exists about a superficially placed or protruding foreign body, removal should be accompanied by the establishment of adequate open drainage.

FRANK TURNBULL

Tumours of the Carotid Body. Peterson, E. W. and Meeker, L. H., *Ann. Surg.*, 1936, **103**: 554.

Tumours of the carotid body are rare. The authors discuss 18 cases; 11 were females, 7 males. The average age was 38. A tumour had been present prior to operation from 4 months to 30 years (average 6 years). A correct preoperative diagnosis was made twice. Eight tumours proved to be malignant. The common carotid artery was tied in seven cases. Four did not develop any evidence of brain damage.

There are no pathognomonic signs or symptoms of carotid body tumour. The usual story is of a single, smooth, deep-seated, slowly-growing, painless, ovoid, firm tumour at the bifurcation of the carotid. It is not attached to the skin or muscles. It is movable laterally but not vertically. In size it varies from that of a hazel nut to a goose egg. A transmitted pulsation is present. It is rarely bilateral. Symptoms due to pressure on the vagus or the cervical sympathetic may be present.

Early and complete removal, if it can be accomplished without the sacrifice of important arteries, is the ideal treatment. The majority of cases that have been treated by roentgen ray and radium have resulted in failure. Thus excision, even if at the expense of arteries, appears to be the only rational treatment. The authors believe that the mortality and morbidity can be lowered (1) by the making of an accurate diagnosis, *i.e.*, by biopsy and proper examination, (2) by attempting before operation

to develop a collateral circulation on the affected side by regular compression of the common carotid, and (3) by ensuring that the first operation be exploratory. If the growth cannot be excised without removal of the carotid then a temporary ligation should be done, to be removed at the first sign of hemiplegia. If no symptoms of brain damage appear, then a secondary operation can be done for removal of the neoplasm.

STUART GORDON

Obstetrics and Gynæcology

Puerperal Infection Due to Anaerobic Streptococci. Schwartz, O. H. and Brown, T. K., *Am. J. Obst. & Gyn.*, 1936, **31**: 379.

In a review of 13,237 deliveries occurring in Barnes Hospital and St. Louis Maternity Hospital from July 1, 1924, to July 1, 1934, these authors confirmed the work of Schottmüller, reported in 1910, that puerperal infection is frequently due to anaerobic streptococci. In 228 cases of puerperal infection Schwartz and Brown found anaerobic organisms present in 83.3 per cent of cases of endometritis, 59 per cent of cases of thrombophlebitis, and 42.5 per cent of cases of septecæmia. In 31 fatal cases anaerobic streptococci were the infecting organisms, in 15 patients of whom 4 were uninfected before admission.

The presence of anaerobic streptococci in the vagina of a large percentage of women at term indicates that the infection is endogenous and develops only when conditions favour their growth. Such conditions are prolonged labour where the tissues have been bruised to some extent, rupture of the membranes for some time before labour, and difficult operative deliveries. Infection with this type of organism may be largely prevented by instillations into the vagina during labour. Since January, 1930, the authors have used 1 per cent neutral acriflavine in glycerin.

ROSS MITCHELL

The Reduction of Mortality in Ectopic Gestation. Gordon, C. A., *Am. J. Obst. & Gyn.*, 1936, **31**: 280.

The impression that the mortality of ectopic gestation is well under control is erroneous. Nearly 6 per cent of the maternal mortality of the City of New York is due to ectopic gestation; equally high figures, with a large percentage of deaths due to sepsis, and many patients never operated upon at all, are reported elsewhere. Even gynæcologists have published inconsistent results. The outstanding fact is failure of diagnosis.

Our textbooks disagree on treatment and for the most part fail to emphasize and discuss thoroughly the importance and value of supportive treatment. It should be possible to rationalize teaching, at least. It should not be said repeatedly that diagnosis is especially difficult, nor should it be unqualifiedly stated that every patient should be operated upon at once, no matter what her condition, no matter who may be the operator.

In the presence of intraperitoneal blood only the simplest operative procedure should be carried out. It is perfectly proper and wise to defer operation in many serious cases, not indefinitely but until transfusion and other supportive treatment lessen the risk of operation.

ROSS MITCHELL

Physiology and Biochemistry

A Study of the Serum Phosphatase in Bone Disease. Woodward, H. Q., Trembly, G. H. and Coley, B. L., *J. of Clin. Investigation*, 1936, **15**: 193.

Since the development of satisfactory methods of determing the phospholytic activity of the blood by Kay, Bodansky, and others there has developed an increasing interest in the relation of blood phosphatase to various pathological conditions. It is now fairly well established that the major portion of the phosphatase in the blood is contained in the erythrocytes; of the phosphatase in the serum a part may well originate in the bones and a part in the liver, kidney, and intestinal mucosa, these structures being rich in phosphatase.

The serum phosphatase of non-osseous origin is raised by the ingestion of carbohydrates, greatly raised by obstructive jaundice, and lowered by starvation and the ingestion of proteins; the serum phosphatase of osseous origin is greatly increased in bone diseases associated with excessive osseous and osteoid formation.

The authors determined the serum phosphatase by a modification of Bodansky's method on normal persons and on cases of neoplastic disease of bone. The phosphatase of normal serum did not appear to differ from that of pathological serum in degree of activation, as measured by the activating effect of magnesium, or in pH of optimum activity. The serum phosphatase was found to be normal or very slightly raised in chronic osteitis, osteomyelitis, benign tumours of bone, endothelial myeloma, and chondrosarcoma, and high in osteitis deformans, generalized osteitis fibrosa cystica, osteoplastic metastatic disease, and in some cases of osteogenic sarcoma, particularly those in which there was radiographic evidence of considerable bone production. Serum phosphatase determinations were not found to be of value in detecting pulmonary metastases.

JOHN NICHOLLS

Pathology and Experimental Medicine

The Presence of the Intrinsic Factor of Castle in the Gastric Juice of Patients with Pernicious Anæmia. Goldhamer, S. M., *Am. J. M. Sc.*, 1936, **191**: 405.

Goldhamer obtained gastric juice from patients suffering from pernicious anæmia during a relapse, incubated it with beef steak after the method of Castle, and fed it to other patients suffering from the same condition. Reticulocyte responses were obtained, the degree being proportionate to the quantity of juice and beef fed to the patient. These results are counter to those of Castle and his co-workers, who obtained no reticulocyte response after the feeding of gastric juice obtained from patients suffering from the disease. Goldhamer concludes that the intrinsic factor of Castle is not absent from the gastric juice in pernicious anæmia but merely deficient in quantity. Thus in relapse the red cells fall to a level determined by the amount of intrinsic factor which the patient is able to secrete in his gastric juice. This hypothesis explains why patients in relapse have variable red cell counts and why those patients with pernicious anæmia who apparently have no intrinsic factor in their gastric juice are able to produce a variety of mature erythrocytes. Neither this nor the hypothesis of Castle explains why characteristic spontaneous remissions occur in the disease.

E. S. MILLS

Present Views of Calcium—Phosphorus Metabolism. Wagoner, G., *Am. J. M. Sc.*, 1936, **191**: 511.

Wagoner draws attention to certain factors which determine the absorption of calcium from the intestinal tract. The normal daily intake of calcium is approximately one gram, and of phosphorus two grams. Under certain conditions, however, much larger quantities of these substances present in the daily diet may fail to be absorbed from the intestinal tract and thus be lost to the individual. He points out that soluble salts of calcium may be thrown out of solution by the presence within the small intestine of excessive amounts of carbonates. An excess of phosphates may have a similar action. In fact a marked alkaline reaction of the contents of the small intestine from whatever cause may precipitate soluble calcium salts. Likewise the presence of large amounts of free fatty acids will render calcium salts insoluble and interfere with saponification. Thus with a diet excessive in fat or through deficient digestion of normal fat (as in celiac disease) failure of calcium absorption may result. On the other hand the assimilation of calcium and phosphorus is augmented by an adequate supply of vitamin D, by an acid reaction of the intestinal contents, or by a systemic acidosis such as may be produced by the administration of ammonium chloride.

Calcium and phosphorus assimilated from the small intestine enter the plasma of the blood and are there maintained in the following proportions; calcium in loose colloidal combination with serum protein 4 mg. per cent; calcium combined with phosphorus in the form of a salt 4 to 5 mg. per cent; and ionized calcium 1 to 2 mg. per cent in organic phosphorus in a concentration of 4 mg. per cent. The first mentioned compound is physiologically inactive and not in equilibrium with phosphorus. The manner in which calcium and phosphorus are removed from the blood stream and deposited in the bones in the proportion of 3 molecules of tricalcium phosphate to 1 molecule of calcium carbonate is not definitely understood. There are two theories; the one that the transformation is by means of specific cells—osteoblasts; the other that permeation and precipitation is of a purely chemical nature. It is generally conceded however that the enzyme phosphature and vitamin D play an important rôle in this deposition. The reverse process, the transfer of bone calcium and phosphorus into the blood when that tissue is deprived of these inorganic elements, takes place even more readily than by assimilation from the diet, thus explaining the decalcification of skeletal bones in certain deficiency diseases.

In addition to the utilization of calcium and phosphorus in bone development, calcium is essential to the clotting of blood, the contractibility of involuntary muscle, and for the maintenance of a normal degree of neuromuscular irritability. It also plays a dominant rôle in maintaining the selective permeability of the living cell. Phosphorus is essential to lipoid metabolism, to the energizing of muscular contraction, and to the functioning of nervous tissue.

E. S. MILLS

Renal Rickets and Dwarfism: A Pituitary Disease. Chown, B., *Brit. J. Surg.*, 1936, **23**: 552.

The cases reported are two sisters who had from birth signs of severe rickets and peculiar emotional upsets. Both had a hypercalcæmia with normal or slightly reduced phosphatæmia without any discernible decalcification of the skeleton. Both had early changes in the kidneys, which would have led to chronic nephritis. One died at 3, the other at 6 months. The parents of the children were first cousins of English-Welsh extraction. The husband had been married before, and the only child of that marriage was a normal son who had a normal child. By his second marriage to his cousin, he had nine children. The first progeny was an ectopic one. The second, third and fourth pregnancies were miscarriages; the fifth and

sixth were stillborn; the seventh was a normal girl; the eighth and ninth are the subjects of the report. The blood Wassermann of the mother was repeatedly negative, as were all the results of medical examination with the exception of a – 12 basal metabolic rate.

The data with respect to the two deformed infants are as follows: Only two minute parathyroids in each infant; normal hypophysis in the one child in whom it was examined in a few sections; but in the second child in whom serial sections of the hypophysis were made there was no pars intermedia or pars posterior. The first child failed to gain weight; the second on whom measurements were made was average in size at birth but became a dwarf before death at six months. This was accomplished by failure of bony growth, although cartilage and osteoid tissue grew. The skull actually grew more slowly than the brain, with resulting increase of intracranial pressure, and final respiratory paralysis. The kidneys were larger than normal, were firm and hard, with deposits of calcium salts in the tissues. Both had excreted calcium casts before death. The disease is interpreted as due to the faulty hypophysis rather than to faulty kidneys. The symptoms of dwarfing, polyuria, and infantilism can be attributed to the former, and the diseased kidneys are looked upon as resulting from disturbed bone growth which in turn causes a disturbed mineral metabolism which damages the kidneys by causing them to excrete too much calcium.

The hereditary nature of this syndrome is indicated by its occurrence in several children of related parents. MADGE THURLOW MACKLIN

Therapeutics

Treatment of Chronic Non-Specific Arthritis with Intramuscular Injections of Sulphur. Kreslin, D., *Brit. M. J.*, 1935, **2**: 1144.

The author gives his results in the treatment of 50 cases of chronic non-specific polyarthritis with intramuscular injections of a 1 per cent sulphur suspension in oil. The cases tested were selected on account of their lack of response to most of the usual out-patient methods of treatment, such as removal of septic foci, vaccines, physiotherapy, and various drugs (not including gold-salts). The sulphur is injected intramuscularly into the thigh or buttock, starting with 0.5 c.c., increasing amounts being given at 5 to 6 day intervals. Local reactions are generally not severe, but in 10 to 24 hours there is a general rise of temperature —a rise to 103° being considered desirable in young and robust patients, 100° being sufficient in older persons. With the temperature there are malaise, headache and aching pains. The dose should not be large enough to induce nausea. When the ultimate results were good the treatment induced at this time an increase of pain, stiffness and swelling of the affected joints. There was invariably a marked polymorphonuclear leucocytosis. A few illustrative case reports are given, and the results summarized.

It is pointed out that this treatment is contraindicated in the acute febrile stage of arthritis, and in elderly, feeble or emaciated persons. The author does not advise its use in nervous patients, those having other active organic disease, as tuberculosis, or in the very obese.

The mode of action is discussed, and a possible specific influence of the sulphur suggested, although undoubtedly the large part of the really striking benefit noted in many cases was due to the non-specific febrile reactions.

It would seem that best results may be expected in patients in whom the changes are limited to the soft tissues about the joint and are not permanent in nature. Less improvement was noted when bone and cartilage involvement was marked, with partial dislocations and gross deformities. A certain tendency to relapse was noted, when etiological factors were still active. W. FORD CONNELL

Prevention of Severe Reactions in the Gold Treatment of Rheumatoid Arthritis. Williams, H. J., *Brit. M. J.*, 1935, **2**: 1098.

In common with other clinicians the author has experienced some troublesome skin reactions during the treatment of rheumatoid arthritis cases with intravenous injections of gold salts. Following the technique of C. Mayer, of the Laennec Hospital in Paris, he has adopted the use of a 10 per cent solution of calcium gluconate, given in conjunction with the gold salt, intravenously. Mayer used "Crisalbine", starting with 0.1 gram, giving a week later 0.15 grams, and thereafter at weekly intervals 0.25 grams, for a 16 weeks' course. The author has used "Allochrysine", and has found it safe to commence with 0.1 gram of this preparation and carry on with weekly doses for a total course of 1.8 to 2.4 grams, with no serious effects in 16 cases, although previously the same salt without calcium gluconate gave troublesome reactions in over one-third of the cases in which it was used. He notes that several cases of the 16 developed a few itchy papules on the hands, or, commonly, on the feet; that these have been disregarded and the treatment continued without ill effect. Also, several cases showed a mild stomatitis towards the end of their treatment, which was in no case troublesome.

The author feared that perhaps the addition of calcium gluconate to the gold would neutralize not only its toxic but also its therapeutic effects. This fear does not seem to have been justified, since not only does the clinical condition of the patient appear to improve as rapidly as with unadulterated gold, but there is also the return of the sedimentation test to normal, which serves

as about the best indication we possess that the disease process is becoming quiescent.

W. FORD CONNELL

Treatment of B. Coli Pyelitis with Alkalis. Osman, A. A., *Brit. M. J.*, 1936, **1**: 575.

The author believes that alkali therapy, if properly used, provides a simple, cheap and effective remedy for all uncomplicated cases of *B. coli* pyelitis. Essential factors in the method are the production of a copious diuresis and a sufficiently alkaline urine. Rest is essential in all acute, pyrexial cases, as long as there are any symptoms or temperature elevation. The sedimentation rate is a useful guide to progress. At least six pints of fluids should be taken daily. The dosage of alkalis should be such as to produce a pH of 7.6 in an early morning specimen of urine. The reaction is best determined by testing with brom-thymol blue. The author recommends that 30 grains each of sodium bicarbonate and potassium citrate be given per dose, flavoured with syrup of orange or peppermint water. This amount is given every one, two, three or four hours depending on the urgency of the case, and continued until the desired result is obtained. This should usually be achieved in 48 hours or so. Then, the spacing of the doses is increased, so that the desired alkalinity of the urine is just maintained (say, 4 doses daily).

If the dose of alkali has been sufficient all the symptoms are usually relieved in two days, and if they persist for much longer than this, the details of treatment having been carefully observed, it usually means complications, as renal or ureteric calculi. Therefore, after 7 to 10 days, if the results are unsatisfactory, the author recommends cystoscopy and pyelography. Successfully treated cases should continue with a moderate dose of alkalis for some months, until several spaced bacteriological examinations have shown the urinary tract to be sterile. Alkalosis is only a danger with the alkali treatment, when there has been persistent and prolonged vomiting or persistent over-breathing from any cause.

The author, in conclusion, notes that the alternative method of treating pyelitis by ketogenic diets or mandelic acid has proved highly successful in a high proportion of cases. A criticism is that the treatment cannot be maintained for a sufficiently long period to prevent relapses which are frequent when these methods are used.

W. FORD CONNELL

The After-history of Lipoid Nephrosis. Major, R. H., *Am. J. M. Sc.*, 1936, **191**: 43.

Major has studied six cases presenting the syndrome of lipoid nephrosis. Two of the patients died, one within two months and the other three years after the onset of the disease. Both showed acute glomerular nephritis with evidence of chronic glomerular changes. Of the remaining 4 patients, one appears to be in good health but shows albuminuria, and 3 are clinically well 8 years, 4½ and 4 years after the onset of the disease. These three patients were treated at one time or another by practically every recommended type of therapy, including high protein diets, blood transfusions, intravenous glucose, thyroid extract, parathormone and various mercurial diuretics such as novazurol and salyrgan. On the high protein diets the patients simply excreted the excess protein as urinary nitrogen. Blood transfusions and intravenous glucose injections were of temporary value only. Thyroid extract and parathormone were valueless, and bacterial antigens were of questionable value. The mercurial diuretics at times produced diuresis, but on other occasions did not. No detrimental effects resulted from their use. One patient died of acute nephritis a few days after receiving gum acacia intravenously. The three patients clinically well appeared to owe their recovery to the use of a very high carbohydrate diet, from 600 to 1,000 grams daily, though the author admits the possibility that the improvement may have been due to the healing powers of nature.

E. S. MILLS

Causes of Death in Diphtheria and their Prevention. Hayne, A. L., *Am. J. M. Sc.*, 1936, **191**: 271.

The author points out that the causes of death from diphtheria fall into three classes: (*a*) asphyxia, (*b*) bronchopneumonia, and (*c*) toxic myocarditis. Asphyxia is mainly due to involvement within and below the larynx and calls for tracheotomy or intubation. Diphtheria antitoxin alone seldom saves the patient. He believes that the frequency of bronchopneumonia in the disease can be held at a minimum if minute attention is paid to cleanliness of hands and instruments when performing intubations, and if correct methods of feeding are followed for patients wearing intubation tubes. It is claimed that diphtheritic myocarditis can often be prevented by the use of 10 per cent dextrose solution intravenously, provided this treatment is begun early and continued daily. In a group of 83 patients at the Municipal Contagious Disease Hospital of Chicago suffering from malignant diphtheria the mortality rate was only 12 per cent under this treatment. This contrasts with a 30 to 60 per cent mortality by other methods of treatment. Excluding 2 patients practically moribund when admitted the mortality would be still further reduced. Further, the average dose of diphtheria antitoxin for the patients in this group was only 39,500 units. The author believes that the dextrose solution aids recovery by providing ready nourishment for the heart muscle, and thus lessens passive congestion of the liver.

E. S. MILLS

Hygiene and Public Health

Prevention of Intravenously Inoculated Poliomyelitis of Monkeys by Intranasal Instillation of Picric Acid. Armstrong, C., *Public Health Rep.*, 1936, **51**: 241.

Experimental and epidemiological considerations indicate that the usual natural route of infection in poliomyelitis is from the nose by way of the olfactory tract. The author reports the results of an experiment which suggests that the instillation of 1.5 c.c. of 0.32 per cent picric acid in saline protects monkeys against the development of poliomyelitis after the injection intravenously of virus. Nine animals were treated in this way, of whom 2 developed poliomyelitis. Among the 9 controls 6 developed the disease.

FRANK G. PEDLEY

Urine Sulphate Determinations as a Measure of Benzene Exposure. Yant, W. P., Schrenk, H. H., Sayers, R. R., Horvath, A. A. and Reinhart, W. H., *J. Indust. Hyg. & Toxicol.*, 1936, **18**: 69.

The commonly used criteria for detecting chronic benzene poisoning are the hæmoglobin content of the blood and the number of red and white cells in the blood as well as certain differential studies of the cellular elements of the blood. These criteria are useful in detecting poisoning when it is well developed, but do not indicate early stages. In order to find a means whereby a much earlier stage of benzol poisoning might be discovered the authors studied the blood and urine changes in dogs exposed to toxic concentration of benzol vapours. They found an early and marked drop in the inorganic sulphates in the urine in terms of the total sulphates present. The blood changes in the dogs occurred considerably later.

The mechanism of this reduction is believed to be due to oxidation of the benzol to phenol which is conjugated in the liver with sulphate ions, to form ethereal sulphates. It is suggested that this method for the early detection of benzol absorption should be applied to human subjects in industry in order to determine its reliability and practicability.

FRANK G. PEDLEY

Pathological Studies on the Organic Effects of Various Hydrazine Derivatives. Hueper, W. C., *J. Indust. Hyg. & Toxicol.*, 1936, **18**: 17.

The gross and microscopic findings in the case of rats poisoned by 4 phenyl hydrazine derivatives, are given.

In one group the animals had received the poison by subcutaneous injection; in a second group the material was painted on the skin of the animals. The animals which were injected, developed more or less severe degenerative lesions in various organs. Rapid death is apparently caused by marked circulatory and metabolic disturbances; delayed death is mainly the result of extensive organic degenerations and necrosis in various organs. In the case of the animals whose skin had been painted with the material, poisoning had not been severe enough to produce death. The pathological changes noted were slight and consisted of a moderate hyperplesia of the spleen and the presence of a moderate amount of brown pigment in the tubular epithelium of the kidney.

FRANK G. PEDLEY

On the Relation Between the Chemical Constitution and Pharmacological Action of Phenylhydrazine Derivatives. von Oettingen, W. F. and Deichmann-Gruebler, W., *J. Indust. Hyg. & Toxicol.*, 1936, **18**: 1.

Phenylhydrazine is used extensively in chemistry, in industry, and to a limited extent in medicine. Pharmacologically it causes destruction of erythrocytes producing methæmoglobinæmia. It has therefore been found of some use in the treatment of polycythæmia. It is also a general protoplasmic poison and an active skin irritant.

In industry a great many derivatives of phenylhydrazine are used. Eleven of these compounds have been studied in regard to their toxicity on subcutaneous injection, their irritant effect on the skin, their anæmiogenic action and their effect on blood pressure, respiration and blood pigment at elevated temperatures.

FRANK G. PEDLEY

News Items

Great Britain

British Medical Association
One Hundredth and Fourth Annual Meeting

The one hundredth and fourth Annual Meeting of the British Medical Association will be held in Oxford this year under the presidency of Sir E. Farquhar Buzzard, Bt., M.D., Regius Professor of Medicine in the University. His presidential address will be delivered on July 21st, and the sectional meetings will be held on July 22nd, 23rd and 24th. The mornings will be devoted to papers and discussions and the afternoons to demonstrations. Registration will be at the Morris Garages, St. Aldate's. The Ladies' Club and Reception Room will be at Rhodes House, South Parks Road. The clinical and scientific work will be divided among twenty Sections, meeting at the University Museum.

The local General Secretary is Dr. F. G. Hobson. All information can be obtained from the Secretary, British Medical Association Office, Keble Road, Oxford. The Randolph Hotel is the official British Medical Association hotel.

Dr. Griffith Evans.—The authorities of the University College of North Wales, Bangor, are planning to establish a memorial to the late Dr. Griffith Evans, who was the first lecturer on veterinary hygiene in

that institution. Doctor Evans, who was a graduate of McGill University, died last December having passed his hundredth anniversary by four months. He was regarded as the father of the veterinary profession, and was distinguished for his researches in the scientific field of medicine. The memorial will take the form of a new wing to the veterinary department of the School of Agriculture in the College, to be named The Dr. Griffith Evans Memorial Wing.

The book entitled "Practical Biochemistry for Students of Medicine", written by Drs. A. T. Cameron and Frank D. White, has obtained much acceptance in Great Britain, having reached its third edition (J. and A. Churchill, Ltd., London, 8s. 6d.). The work has been favourably reviewed, as it covers the ground in an attractive and efficient manner. No extensive changes have been made in the new edition, but careful revision has brought the subject-matter up to date.

A French Tribute to British Research.—The President of the French Republic has been pleased to confer upon Sir Henry Wellcome, LL.D., F.R.S., la Croix d'Officier de la Légion d'Honneur. This decoration is a further tribute to British medical and chemical research to which Sir Henry has made many notable contributions.

Alberta

The President of the Canadian Medical Association, Alberta Division, Dr. D. S. Macnab and Dr. R. R. Hughes, of Calgary, attended meetings of the local medical societies at Claresholm and Blairmore. In addition to each giving a scientific paper, Dr. Macnab discussed the question of closer organization.

On April 19th, the Medicine Hat District Medical Association met at Brooks, when Dr. W. Merritt and Dr. A. J. Fisher, of Calgary, presented scientific papers.

The Alberta Medical Association, in cooperation with the Faculty of Medicine of the University of Alberta, gave a "refresher course", commencing on May 11th, and finishing on May 15th. On the afternoon of the latter day the annual convocation of the University was held, so that visiting physicians were able to attend that function.

A District Medical Meeting was called to meet at Edmonton on May 12th, to organize a District Association taking in the country points west, north and northeast of Edmonton, in what would be called the territory tributary to that City.

Recently the Council of the College of Physicians and Surgeons met in Edmonton, the business being mostly of a routine nature. One question up for discussion was that of municipalities making contracts with hospitals, whereby on payment of a 75 cents per day rate for all patients going from the municipalities to the hospitals the hospital would not charge the municipality anything extra for the care of indigents, it being understood that the hospitals were free to collect accounts from all patients who are able to pay. Complaint was made that while the municipalities made arrangements for paying hospitalization they made no provision for paying the medical practitioner for his care of the indigents. No conclusion was arrived at, the matter being sent to Committees who would report at the next meeting of the Council.

The Hon. Mr. Manning, Provincial Secretary, has announced that it is the intention of the Government to make some provision to pay for the hospitalization and medical care and treatment of victims of motor car accidents; the money will come from the fund created by doubling the driver's license fee, and making it an annual one.

The chiropractors had an amendment put through the Legislature, whereby, the two medical representatives on their Board are replaced by two chiropractors; thus the Board will stand composed of five, four of whom will be chiropractors and the other will be a layman.

The Legislature passed an amendment to the Hospitals' Act facilitating the entrance of patients into the hospital, in case of urgent necessity.

G. E. LEARMONTH

British Columbia

Dr. Stewart Murray, D.P.H., was appointed to the Vancouver School Board Medical Department as pyschiatrist. Dr. Murray will be a full-time employee and his salary has been set at $4,000 per annum, less existing School Board reductions. It was also provided that his salary should not exceed the maximum of $4,300 per annum.

There have been a large number of cases of rubella and mumps during the month of March. There were 2,173 cases of rubella and 363 of mumps reported by the School Board amongst pupils of city schools in Vancouver, as compared with 2 cases of rubella and 32 cases of mumps in March, 1935.

The report of Dr. W. H. Walsh, of Chicago, who has recently made a survey of the Vancouver General Hospital, has been submitted to the Vancouver City Council. A $1,500,000 program, designed to bring the accommodation and facilities of the Vancouver General Hospital to an adequate standard including construction of the new 500-bed building for acute cases, was presented to the Civic Finance Committee. The Chairman of the Board of Directors of the Hospital states that the hospital for some time past has been working both personnel and equipment beyond the normal factor of safety, and that factor has now been so far exceeded that the hospital is operating continuously on an emergency basis. The scheme submitted by Dr. Walsh, it is stated, will require six months for planning and nine months for construction. Dr. Haywood, general superintendent of the hospital, considers that these estimates are optimistic.

The British Columbia Cancer Foundation has been granted affiliation with the British Empire Campaign Headquarters in London, it is announced by Mr. E. W. Hamber. Mr. Hamber who is president of the Foundation, has recently been appointed and sworn in as Lieutenant-Governor of British Columbia.

The Coast Steamship *Princess Maquinna*, while off the coast of Vancouver Island recently, celebrated the third visit of the stork. A boy was born to one of the passengers and fortunately with the assistance of a trained nurse, who happened to be on board, the mother and child were given good attention. Upon arrival in Victoria the ship was met by a physician and ambulance, who took them to the Jubilee Hospital, where they were reported doing well. Two other children have been born on the *Maquinna* on previous voyages.

D. E. H. CLEVELAND

Manitoba

In a judgment given on April 20th by Mr. Justice Dennistoun, Dr. Omer G. Hague, radiologist of Winnipeg, was awarded $849.99 in an action brought by him against the Sisters of St. Boniface Hospital. When the question of euthanasia was being discussed in England an interview with Dr. Hague appeared in

a local paper on November 8, 1935, in which the doctor strongly favoured legalized euthanasia. After the publication of the interview the Sisters of St. Boniface Hospital where Dr. Hague served as radiologist, notified him that his services were no longer required and paid him one month's salary. Dr. Hague brought action for $3,116.63, a year's salary, for alleged wrongful dismissal. The Court found that without evidence to show that the plaintiff violated the moral code by which all Catholic hospitals are governed the dismissal without "reasonable notice" was not justified. The plaintiff, as a professional man, had a right to express his opinion on a scientific subject in a newspaper or otherwise. ROSS MITCHELL

New Brunswick

The Association of Officers of the Medical Services of Canada, New Brunswick Branch, at their quarterly meeting in April, listened to an address by Major A. S. Kirkland, entitled "Genghis Khan as a Cavalry Leader". The meetings of this Association are attracting an increasing number of interested physicians, and the success of this branch is definitely ascribable to the interest shown by the G.O.C. and the D.M.O. of the District, as well as to that of the individual members.

A complimentary dinner to Dr. Joseph Tanzman and Dr. D. W. F. Porter at the Union Club in Saint John was enjoyed by the members of the Saint John Medical Society. These two gentlemen have recently become benedicts.

Dr. Harold E. Baird, who previously practised in Chipman, has transferred his practice to Centreville, Carleton County.

Dr. F. M. Brown, Centreville, is a patient in the Fisher Memorial Hospital at Woodstock.

Dr. L. M. Curren, one of the best known of the senior surgeons of Saint John, is still confined to hospital following a serious abdominal operation.

Dr. George Lyons, of Moncton, has recently spent some time in post-graduate work in Boston.

Dr. Alphonse Sormany has been re-elected mayor of Shediac. A. S. KIRKLAND

Nova Scotia

Dr. E. K. MacLellan, Dalhousie Professor of Obstetrics, was elected president of the Halifax Branch of the Nova Scotia Medical Society at its annual meeting on April 30th. The Vice-president is Dr. Ralph P. Smith, provincial pathologist. Drs. W. G. Colwell, P. S. Campbell, G. A. Winfield and N. B. Coward form the new executive. Dr. Clyde Holland continues as secretary-treasurer.

Despite Government efforts of recent years, there are still some two thousand cases of pulmonary tuberculosis "running wild" in this province, according to Dr. Charles Beckwith, assistant medical superintendent of the Nova Scotia Sanatorium.

The *Dalhousie Medical Journal*, an undergraduate publication, Vol I, No. 1, appeared in April. Its emblem is that of the under-graduate medical society, a hand bearing a pine cone. The pine cone is the most ancient known symbol of the healing art. The Greeks adopted the symbol from the Egyptians, and Æsculapius is sometimes represented as holding a pine cone in his left hand, the right bearing the familiar caduceus. The *Journal* in appearance and tenor shows the true professional touch.

Dr. Hugh MacKinnon, a native of Lake Ainslie and a graduate of Queen's, is taking over the North Sydney practice of the late Dr. J. W. MacLean.

Their columns crowded with stories of the Moose River disaster, local presses have found space to voice their indignation over the importation of the Prævex and Inductotherm used in the treatment of Alfred Scadding. These apparatuses, they claim, could have been, and should have been, procured locally.

Dr. C. M. Bethune (Dal., '31) has received an appointment in anæsthesia to the Visiting Staff of the Victoria General Hospital. Doctor Bethune recently resigned from the resident staff where he has served for the past five years. He will take up the practice of his specialty in Halifax.

Dr. O. B. Keddy, surgeon and mayor of Windsor, N.S., for thirteen years, was tendered a banquet and presentation by the citizens of Windsor in appreciation of his long, public service.

Kentville, home of the Nova Scotia Sanatorium, is to have a general hospital, and the sum of $33,000 has been allocated for that purpose. A. L. MURPHY

Ontario

Expenditures totalling about $12,000 have been authorized by the Trustees of the Galt Hospital Trust. This money will be expended to provide an improved maternity section and an isolation ward.

The Provincial Department of Health announced that, on June 1st, there will be a diagnostic clinic for tuberculosis and diseases of the chest at North Bay.

A recent statement from the Provincial Department of Health recorded 17,944 hospital beds in the Province, including public, private, and veterans' hospitals. Of these, 11,050 were occupied by patients with a diagnosis of insanity or mental deficiency.

On April 14th, the Honourable Dr. Bruce, Lieutenant-Governor of the Province, in the presence of 300 representative men and women, opened the new wing of the Kitchener-Waterloo Hospital.

The Board of Health of the City of Peterborough has ordered plans for the conversion of the Queen Mary Isolation Hospital into a sanatorium for the treatment of Peterborough patients who at present must be treated elsewhere.

In commemoration of the achievements of Sir William Osler, the Hamilton Academy of Medicine has instituted a scholarship to be competed for annually by McMaster University students who intend to proceed to the study of medicine. It is necessary for each competitor to provide an essay of from 3,000 to 4,000 words on the life and work of this great physician. Students in senior and junior years will be eligible. The prize is $50.00, to which an additional $50.00 will be added after the successful completion of the first year of the medical course.

April 29th was the date of the annual Clinic and Demonstration of the Hamilton General Hospital, in which 54 surgeons and physicians collaborated, demonstrating the various diseases and their complications, with methods of treatment. Some 800 Ontario physicians attended the Clinic. J. H. ELLIOTT

Saskatchewan

Hon. J. M. Uhrich, Minister of Health, in the budget debate in the house, stated that the present was not the time to inaugurate a system of state medicine. The municipalities are now 35 million dollars in tax arrears and five hundred thousand dollars behind in the tuberculosis levy; they are five million dollars behind in public revenue tax payments. "If the municipalities cannot carry the tax load that they now bear how can they carry more?" asked the Minister. The Saskatchewan treasury is already contributing to the public health services more than the equivalent of the two-ninths contribution required under the proposed British Columbia scheme.

Dr. Uhrich gave the house a complete review of the work of his department. Activities of the sanitation division are directed towards ensuring that the health of the people will not be undermined by polluted water supplies, infected milk, impure food or unsanitary surroundings. The supervision of water and sewage services is entrusted to engineers and inspectors of the division of sanitation. During the past year 1,153 individual written opinions were given regarding the safety of farm water supplies, and recommendations were made as to the method of improving the quality of the sources of these supplies.

Municipalities have power under the Public Health Act, to pass by-laws requiring all milk sold to citizens to be pasteurized. The Minister urged that municipal councils take advantage of this legislation.

Cooperative effort between officials of the sanitation division and inspectors of the Dominion health of animals branch is being maintained in the testing of cattle for tuberculosis and contagious abortion. An increase in undulant fever has taken place. In 1933 there were 6 cases and no deaths; in 1934 there were 28 cases and 2 deaths; in 1935 there were 35 cases and 4 deaths.

The staff of public health nurses has been reduced to eleven, but these eleven nurses have during the year visited over 400 schools and have inspected 150,000 children. In addition, these nurses made 5,500 home visits; they also assisted the medical health officers in the immunization of children in one hundred and eleven schools. The public health nurses organized 20 dental clinics and assisted at 96 additional dental clinics.

A dental fund of $1,500 made up of contributions from the Saskatchewan Dental Society, the Canadian Dental Hygiene Council and the department of public health, is being administered by representatives of these three bodies. Last year 96 schools, all in relief areas, were assisted by this fund. The districts contributed $678.

Dr. Uhrich quoted from a report of the superintendent of the Anti-Tuberculosis League that "slowly but steadily this dread disease (tuberculosis) is being reduced year by year". Two main obstacles in wiping out the disease are that two-thirds of the population are still using milk supplies from cattle from which tuberculosis has not all been eliminated, and, second, that the disease is still very prevalent among the Indians, where effective methods of control have not yet been instituted. Saskatchewan has the lowest death rate from tuberculosis of any of the provinces.

The province is now paying for health services $2,500,000 annually.

Dr. R. L. King was host to the April meeting of the Prince Albert Medical Society. Dr. R. W. Kirkby gave a paper on "Heart irregularities"; each case was described as to etiology and diagnosis and classed as major and minor. Digitalis and quinidine therapy were discussed. He described the uses and limitations of the electrocardiograph.

A case of meningococcic meningitis with fatal outcome was presented at the Grey Nuns' Staff luncheon by Dr. J. T. Waddell. In discussing the case Dr. Urban Gareau said that in the last ten years he had treated 10 cases of meningitis; 4 of these recovered. Treatment is the administration of meningococcic antitoxin, intrathecally 20 c.c., and intravenously 10 c.c., daily.

LILLIAN A. CHASE

General

The International Union Against Tuberculosis.—The Xth Conference of the International Union against Tuberculosis (Secretary-General Prof. Fernand Bezançon) will meet in Lisbon from September 7 to 10, 1936, under the chairmanship of Prof. Lopo de Carvalho. The discussion will be limited to three main subjects: Biological subject: "Radiological aspects of the pulmonary hilum and their interpretation", opening report by Prof. Lopo de Carvalho (Portugal). Clinical subject: "Primary tuberculous infection in the adolescent and the adult", opening report by Dr. Olaf Scheel (Norway). Social subject: "The open case of tuberculosis in relation to family and domestic associates", opening report by Drs. C. J. Hatfield (United States) and D. A. Powell (Great Britain). Ten speakers, selected in advance from a list presented by the 44 countries belonging to the Union, have been designated to open the discussion on each of the questions on the agenda.

The Organization Committee of the Conference has prepared a very attractive program of receptions and excursions. The latter will enable members of the Congress to visit the chief anti-tuberculous institutions as well as the most picturesque scenery in various parts of Portugal.

Members of the International Union are invited to take part in the Conference free of any contribution fee. They may forward their applications either through the medium of their Government or their National Organization against Tuberculosis, or directly to the Organizing Committee in Lisbon, at the following address: Organizing Committee of the Xth Conference of the International Union against Tuberculosis, Assistencia Nacional aos Tuberculosos Avenida 24 de Julho, Lisbon (Portugal).

Names may also be sent to the Headquarters of the Secretariat of the International Union against Tuberculosis, 66, Boulevard Saint-Michel, Paris (6ème).

Persons who are not members of the Union and who wish to take part as "Members of the Conference" must forward their application, together with a contribution of 200 escudos (approximately 125 French francs), exclusively through the medium of Canadian Tuberculosis Association, Plaza Building 304, Ottawa.

Reductions on hotel prices and railway fares will be granted to members of the Congress.

The following gentlemen will open the discussions.

Biological subjects.—Austria, Dr. Ludwig Hofbauer; Czechoslovakia, Dr. A. Hoffmann; France, Prof. Emile Sergent, Drs. L. Delherm and P. Cottenot; Germany, Prof. Dr. H. Kleinschmidt; Great Britain, Dr. W. T. Munro; Italy, Prof. Aristide Busi; Lithuania, Dr. L. Koganas; Poland, Prof. W. Zawadowski; United States, Dr. H. C. Sweany.

Clinical subjects.—France, Dr. J. Troisier; Germany, Dr. Redeker; Great Britain, Dr. L. S. T. Burrell; Hungary, Dr. Géza Gali; Roumania, Drs. S. Irimescu and M. Nasta; Spain, Prof. L. Sayé and Dr. Tapia; Sweden, Dr. H. Ernberg; United States, Dr. Robert E. Plunkett; Yugoslavia, Dr. Yevrem Nedelkovitch.

Social subjects.—Belgium, Dr. Willems; Finland, Dr. Severi Savonen; France, Drs. P. Braun and Albert Bezançon; Germany, Dr. Braeuning; Italy, Prof. Gioacchino Breccia; Netherlands, Dr. H. R. Gerbrandy; Norway, Dr. Nils Heitmann; Poland, Dr. Janina Misiewicz; Portugal, Dr. Ladislau Patricio, Switzerland, Dr. J. Morin.

Full information may be obtained by applying to the International Union against Tuberculosis, 66 Boulevard Saint-Michel, Paris (6e).

2 Important Announcements

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Emmenin is now available in tablet form. This convenient method of administering Emmenin will appeal to many physicians because of the simplicity and accuracy of the dosage, each tablet representing one teaspoonful of Emmenin Liquid.

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MONTREAL » » CANADA

Reorganization of the International League Against Epilepsy.—At the time of the International Neurological Congress in London a meeting of those particularly interested in epilepsy was held on July 31, 1935, at the Lingfield colony. Thirty-two doctors representing 14 countries were present. After discussion it was unanimously decided that the International League against Epilepsy should be revived. The immediate efforts should be directed towards the improvement of the social condition and the institutional care of persons with epilepsy. To this end it was agreed that a publication should be issued annually or oftener, acquainting readers with facilities and with remedial efforts carried on in various countries. Plans were also laid for a meeting of the League at the time of the next Neurological Congress in Copenhagen.

At an adjourned meeting held August 2, (Prof. A. Ley, of Brussels in the chair) the following officers were elected: *President,* William G. Lennox, Boston, U.S.A.; *Secretaries,* H. I. Schou, Dianalund, Denmark, L. J. J. Muskens, Amsterdam, Holland; *Treasurer,* Tylor Fox, Lingfield, Surrey, England.

All persons interested in improving the condition of epileptics are invited to join the League. Membership, which includes subscription to the periodical, is the equivalent of 5 shillings a year, or 15 shillings for the four year period.

The Rockefeller Foundation. — The Rockefeller Foundation expended $12,679,775 during the year 1934, according to its annual report, which has been published recently. In commenting upon the activities of the year, Max Mason, president of the Foundation, said in part:

"The determination of sound Foundation procedure in the application of funds to the well-being of man becomes unusually difficult when increased opportunity and need coincide with diminished resources. Such a situation, at a time of rapid change in world conditions, demands the careful thought of those responsible for the selection of the fields and methods of work which promise to yield the most tangible and lasting benefits.

"The decisions reached during the year 1934 as to program in the immediate future bring increased emphasis on special fields, and on realistic research designed to meet definite and clearly recognized needs."

The grants of the Foundation included five broad fields of scientific endeavour. Public health activities were supported during 1934 by a budget of $2,200,000. Work in the medical sciences received a total of $1,026,200. The natural sciences were aided by $1,051,210. The social science program received appropriations totaling $1,164,690. The field of the humanities was given grants amounting to $749,500.

The summary of the Foundation's work during 1934 in the field of public health as given in the annual report is as follows:

"Operating on a budget of $2,200,000 for public health activities, The Rockefeller Foundation in 1934 engaged in field research on yellow fever, malaria, hookworm disease, tuberculosis, undulant fever, yaws, and diphtheria; conducted yellow fever surveys and control campaigns; carried out projects in malaria control, supported numerous demonstrations of complete public health programs; gave aid to the organization or maintenance of essential services of state and national health departments; and continued its contribution for the training of public health personnel through aid to schools and institutes of hygiene and public health as well as by support of a fellowship program."

The Foundation's support of work in the medical sciences, totaled more than a million dollars and included the following projects:—

"Aid of four types was given for the advancement of psychiatry: grants to universities and other institutions for the development of research and teaching in psychiatry and associated subjects; endowment and building funds for establishing psychiatric departments; research aid grants to individual workers engaged in important investigations in mental diseases; and fellowships to enable men and women especially qualified for work in this field to obtain desirable advanced training.

"Grants for work in psychiatry were made to McGill University for research and teaching; to the Massachusetts Department of Mental Diseases for studies in psychiatry at the Boston State Hospital; to the Worcester State Hospital, Massachusetts, for research on dementia præcox; to the Johns Hopkins University, for the development of child psychiatry in the pædiatric clinic; to the University of Leiden, for child psychiatry; to the Chicago Area Project, for the study, treatment, and prevention of juvenile delinquency within a few selected areas in Chicago; to the University of Rochester, for the Child Guidance Clinic; to the National Committee for Mental Hygiene, towards support of its general expenses during 1935; to the University of Colorado, for the teaching of psychiatry in the medical school; to the University of Michigan; and the Institute of the Pennsylvania Hospital, for the development of teaching and research in psychiatry.

"For work in neurology and related subjects, gifts were made to New York University, to Northwestern University Medical School, the University of Pennsylvania, the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne, Australia, Dartmouth College, and the Lister Institute of Preventive Medicine, London."

The Thirty-eighth Annual Meeting of the Medical Library Association will be held in St. Paul, Minn., June 22 and 23, 1936, and in Rochester, Minn., June 24. Sessions will be held at the Ramsey County Medical Society, New Lowry Medical Arts Building, St. Paul, and at the Mayo Clinic, Rochester.

The program will include addresses, discussions, and demonstrations on library procedure, medical history and literature.

This Association consists of about 175 of the medical libraries of this country and Canada, together with their librarians and a group of supporting members who are physicians interested in the advancement of medical libraries.

The officers of the Association are as follows: *President,* Dr. W. W. Francis, Montreal; *Vice-president,* Dr. A. H. Sanford, Rochester, Minn.; *Secretary,* Miss Janet Doe, New York; *Treasurer,* Miss Mary Louise Marshall, New Orleans; *Chairman of Executive Committee,* Miss Marjorie J. Darrach, Detroit.

All interested in the development of medical libraries and a wider knowledge of medical literature are invited to attend.

The First International Conference on Fever Therapy. is to be held at Columbia University, New York City, from September 29 to October 3, 1936. The subjects to be discussed will include physiological and pathological changes as well as the treatment of gonorrhœa; gonorrhœal and non-specific arthritis; syphilis; neurological conditions such as multiple sclerosis, chorea, paresis, tabes; skin diseases, etc.

The meeting will be held under the chairmanship of Baron Henri de Rothschild of Paris, France. The French Committee, of which Professor d'Arsonval is Honorary President, is under the chairmanship of Professor Abrami. The American Committee consists Drs. Desjardins, Bierman, Hartman, Hinsie, Neymann, Simpson and Warren. National European Committees are being formed under the direction of Professors Maranon, of Spain, Frugoni, of Italy, Volhardt, of Germany, Wagner-Jauregg, and Eppinger, of Austria, Michaux, of Switzerland, Bessemans, of Belgium, and Danielopolu, of Roumania.

Information regarding this Conference may be secured from the General Secretary, Dr. William Bierman, 471 Park Avenue, New York City, U.S.A.

Don't Depend on Symptoms Alone

SYMPTOMS alone are not always reliable in the diagnosis of alimentary tract disease. Hemorrhage, dyspepsia, pain—one or all may be merely incidental, or absent altogether. Often, gastric disturbance is the reflex indication of lesions elsewhere in the alimentary tract or in the gall-bladder.

X-ray examination of the *entire* digestive tract is a dependable means of assuring accuracy in diagnosis. For example, even though a diagnosis of gastric cancer has been made, radiographs may show likewise that another viscus is affected—findings that may contraindicate operation. Equally important, a gastric lesion may be disclosed when signs point to colonic involvement.

Depend on complete x-ray examination to check your diagnosis . . . Refer to your radiologist every case of suspected alimentary tract involvement.

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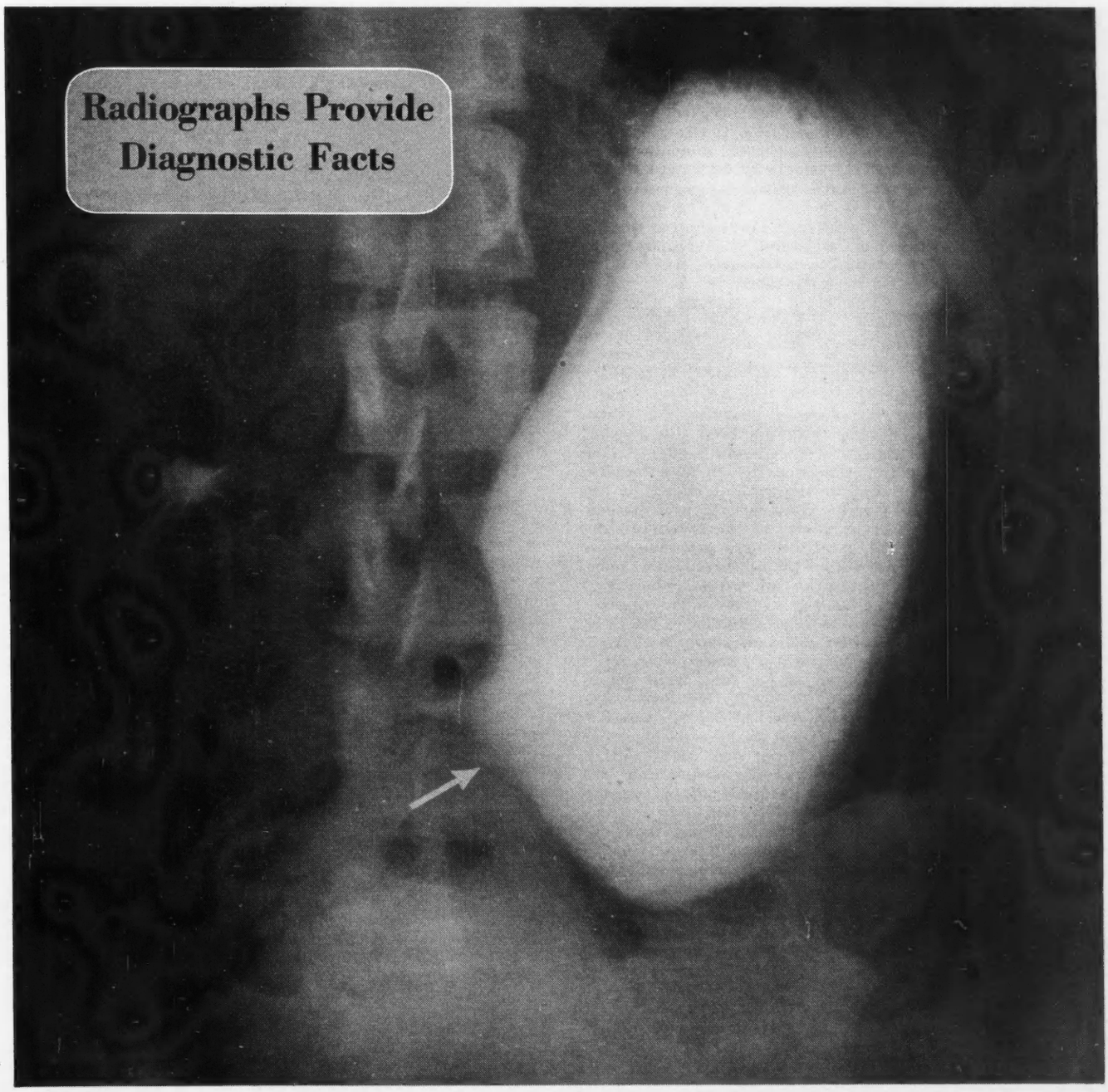

Book Reviews

Tumours of the Urinary Bladder. Edwin Beer, M.D., F.A.C.S., Visiting Surgeon, Mount Sinai Hospital. 157 pages, illustrated. Price $3.50. Wm. Wood, Baltimore, 1935.

The work of Dr. Beer in the therapy of bladder tumours is sufficiently outstanding that any utterance of his on this subject merits careful attention. His application of transurethral electro-coagulation with a monopolar or bipolar current marked an epochal advance in the treatment of these conditions. In the 25 years since he first applied the Oudin current to a bladder tumour through the cystoscope, his activities in this field have been continued.

In a recently published monograph he has collated his experiences in an interesting and adequate manner. He has laid most emphasis upon treatment and the larger portion of the book is concerned with this aspect of the subject. The study is based upon 650 cases of bladder tumour which had been treated in his clinic by various methods, used alone and in combination. The author very properly declares against "dogmatism and strict adhesion to any one form of treatment", and pleads for a proper selection of treatment in accordance with the condition presenting itself. Electro-coagulation, radium implantation, bladder resection have all been used. The manner of approach has been transurethral or suprapubic, and the various forms of treatment have been combined in individual cases. In a small number of cases even a complete cystectomy with implantation of the ureters in the skin has been practised with encouraging results.

The monograph is printed in an attractive form, is well illustrated, and an extensive bibliography is included. It is a creditable publication, and can be warmly recommended to our readers.

Chronic Nasal Sinusitis. F. A. Pickworth, B.Sc., M.B., B.S., A.I.C.(Exam.), Director, Joint Board of Research for Mental Disease, City and University of Birmingham. 156 pages, illustrated. Price 16s. net. H. K. Lewis, London, 1935.

Following the introductory chapter, the author proceeds to a description of the anatomy and physiology of the nasal sinuses. He stresses not only their close proximity to the cranial cavity but also the close anatomical relationship to the cranial cavity in the respect of blood vessels and nerves, with special reference to the close proximity of the sphenoid sinus to the pituitary gland, carotid artery, cavernous sinus, etc. He emphasizes the fact that diseased sinus membrane allows rapid absorption of toxins, whereas if the sinus membrane is healthy and the cilia are functioning normally absorption is prevented.

In an examination of 1,367 sinuses by the Watson-Williams technique of puncture and saline suck-out it was found that only 353, or 25 per cent, were sterile. Normally the sinuses are quite sterile. Of these cases the sphenoid sinuses were the worst offenders. Cultures taken from the sphenoidal sinus within two hours of death showed organisms in 76 per cent. The author stresses the importance of vascular changes in the brain in all types of insanity and points out the possible relationship of chronic focal sepsis to cerebro-vascular disease, special reference being made to sphenoidal sinusitis. This book should be a stimulus to a more thorough investigation of nasal sinuses, not only in mental disorders but in other diseases.

Infant Nutrition. W. McKim Marriott, B.S., M.D., Professor of Pædiatrics, Washington University School of Medicine. Second edition, 431 pages, illustrated. Price $5.00. C. V. Mosby, St. Louis; McAinsh, Toronto, 1935.

This edition is, like the first, a comprehensive, clearly written, and authoritative survey of the nutritional needs of the infant. It covers most satisfactorily the feeding of the normal infant, as well as the feeding of the infant whose nutrition has suffered from any cause, be it infectious or metabolic.

A few changes are worthy of note. Anhydræmia, acidosis, and alkalosis are now discussed under those conditions of which they are symptoms. Under vomiting pyloric stenosis is discussed also. This treatment has resulted in a somewhat smaller volume, but has avoided repetition. Allergic reactions to foods are discussed broadly in one chapter and also, rightly so, in the chapter on vomiting. The chapter on vitamins has been rewritten and is much more acceptable in this presentation.

Acid milk feeding and cœliac disease have also been rewritten in a much clearer way. The diet suggested in the early stages of the latter condition, however, would appear to be too liberal for the average case of true cœliac disease. The book is to be commended.

John Whitridge Williams — Academic Aspects and Bibliography. J. Morris Slemons. 109 pages. Price $1.50. Johns Hopkins Press, Baltimore, 1935.

This publication is the presidential address given by Dr. Slemons before the Pacific Coast Society of Obstetrics and Gynæcology. Most of us have learned to know Williams by his textbook, and many have undoubtedly grown curious as to the manner of man he was—this great master of obstetrics. Here is an all too brief sketch by an old pupil and associate. It is a sincere and reserved tribute to a great preceptor. The time allowed to the original presentation undoubtedly affected its full maturation, so that one is left with a desire to learn more of this man, who had so much to do with the development of scientific obstetrics in Johns Hopkins.

Agents of Diseases and Host Resistance. F. P. Gay and others. 1,581 pages; illustrated. Price $10.00. C. C. Thomas, Springfield and Baltimore, 1935.

This book is the result of the collaboration of several authors under the coordinating influence of Prof. F. P. Gay. It is provided with all the advantages of the special knowledge possessed of selected individuals, but the disadvantage of inequality in strength is not so noticeable in the different sections as is usual in works of this kind.

The book is in very truth "a mine of information" made available in a most readable form, and, to the benefit of inquiring minds, the more important sources of this information are given in lists of references at the end of each chapter. But the book is more than this, for it is marked throughout by that indefinable stimulating quality, born of the enthusiasm of a real master, which is evidenced most particularly in the clear statement of principles rather than in summarizing existing knowledge and describing practical applications. A careful analysis and evaluation of available information is evident in the balanced description and discussion of the various subjects. There is no semblance of an attempt to gloss over the difficult and controversial problems of today; they are sometimes simplified by a search for underlying general principles, and this treatment is more illuminating than the more usual detailed discussion of the confusion of ideas in which many such problems are imbedded. However, those particularly interested in certain subjects in some cases will have the personal opinion that the emphasis is unsatisfactorily placed or that their treatment is incomplete; for example, certain might feel such dissatisfaction with the treatment of the Salmonellas, the Corynebacteria other than *Cor. diphtheriæ*, and, rather surprisingly, perhaps, Staphylococcus. But the field covered by the book is so vast that many subjects have been treated succinctly of necessity. The preface and opening chapters of the

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book in which the supreme importance of etiology in the classification, description and understanding of diseases is stressed, without belittling the importance and usefulness of a knowledge of the course and results of disease processes, can be recommended with confidence to the reading of pathologist and clinician alike, and very few of us will not benefit. The clear-cut argument that the importance of changed structure has overshadowed the importance of changed function in the study of disease, and that both "have temporarily obscured the ultimately more important field of etiology" points a lesson of particular importance today.

The book cannot be too highly recommended to teacher and student alike, with the confidence that neither will be disappointed. The numerous illustrations are good and to the point, while those representing complicated conceptions diagrammatically should help the understanding of what is already clearly described. There is no difficulty in believing, with the authors of this book, that one man could not write it, dealing as it does with inanimate and animate agents of disease, in the widest sense of these terms. Truly, it deals with the chemical agents merely in outline, but with the immunological, bacterial, virus, fungous and animal parasite agents quite fully. The book is what might well be expected from Professor Gay, who has made so many important contributions to our knowledge of bacteriology and immunity.

Individual Exercises. G. T. Stafford, M.S., Director, Corrective Physical Education, University of Illinois; Harry B. DeCook, M.A., Director, Corrective Physical Education, Northwestern University; and Joseph L. Picard, M.S., Director, Corrective Physical Education, University of Arizona. 111 pages, illustrated. Price $1.00. A. S. Barnes, New York, 1935.

The exercises described are those which are used in the departments of corrective physical education of the universities to which the authors are attached. A well-written chapter on the need for exercise opens the book, and is followed by outlines of three sets of exercises for various common conditions, presumably for use only after a medical examination and upon the advice of the examining physicians. One hundred exercises are described and illustrated by line drawings. This is a very useful book for physicians and others who wish to prescribe exercises as corrective measures.

The Practitioner's Library of Medicine and Surgery. Vol. IX., Neurology and Psychiatry. 1,202 pages, $10.00. D. Appleton-Century Co. Inc., 1936.

The preceding eight volumes of this series were reviewed in the December, 1935, issue of this *Journal*.

The supervising editor states in the preface "The ultimate welfare of the patient with a 'nervous disease' often depends upon the alertness and insight of the physician whom the patient first consults. That practitioner must appreciate the personality make-up of his patient, and he must be made to recognize organic disease of the nervous system in its incipient clinical state." His approach to the understanding of the neuroses and the psychoses is by discussing the component parts of a personality, the principles underlying human behaviour, the conflicts and maladjustments within the normal range and psychopathic personalities. Psychoanalysis is critically surveyed, from the training of the analyst to the diagnostic and therapeutic value of this form of treatment. This is a thoroughly practical work on these two specialties. The neurological and psychiatric manifestations are discussed under each of the five main types of injury—infection, intoxication, neoplasms, trauma and vascular lesions. The etiological and pathological features of each disease process are prominently and clearly depicted. For example, in pyogenic meningitis the contributor recommends the injection of 2 c.c. of oxygen, or air, if oxygen is not available, prior to cervicolumbar irrigation with sterile isotonic saline combined with homologous polyvalent serum. And, in cases of suspected cerebral hæmorrhage the presence of bloody spinal fluid is sufficiently diagnostic to disprove the presence of cerebral thrombosis. The lessening of the cerebrospinal pressure by ten to fifteen mm. of mercury will decrease the depth of shock. This volume is a valuable addition to the series and is well worthy of being on any busy practitioner's reading list for the year 1936.

Child Psychiatry. Leo Kanner, M.D., Assistant Professor of Psychiatry, Johns Hopkins University. 510 pages. Price $6.00. C. C. Thomas, Springfield and Baltimore, 1935.

This book is, according to the author, the first textbook of Child Psychiatry in the English language which attempts to cover the whole field of children's personality disorders on a broad, objective, unbiased and practical basis. It has grown out of the close cooperative relationship between the Departments of Pædiatrics and Psychiatry in Johns Hopkins Hospital. Appreciating fully the limitations of our present-day knowledge of the psychiatric problems of childhood, the author has refrained from making any attempts to categorize into rigid patterns the various manifestations of personality disorders in children and has related the available information on this subject to what he calls the somatic factor, the emotional, sex, constitutional and environmental factors. The main part of the book is devoted to a description of personality difficulties forming essential features or sequels of physical illness, the manner in which personality disorders in children may resolve themselves into the various types of hypochondriasis, and the forms in which emotional disorders may express themselves as whole dysfunctions of the individual in the form of jealousy, temper and fear reactions, faulty feeding habits, sleep disturbances, antisocial trends, and the more serious types of psychotic reactions. The section which is devoted to the principles and aims of psychiatric treatment is particularly valuable because of the practical way in which the treatment of these problems is presented. The psychobiological approach which the author utilizes here, the numerous case histories presented to illustrate the subject matter under discussion, and the very practical treatment measures advocated, should make this book a very valuable aid to all those physicians who are primarily interested in the treatment of the physical and mental disorders of childhood.

Roentgenology. Alban Koehler, Wiesbaden. Second edition translated by Arthur Turnbull, M.A., B.Sc., M.B., Ch.B. 681 pages, illustrated. Price $15.00. Baillière, Tindall & Cox, London; Macmillan, Toronto, 1935.

This book, according to the author, is sometimes referred to as the "Bible of Roentgen-Rays". This is perilously close to hyperbole, but there is no doubt of the work's popularity, since it has been published in several different languages and has received the highest roentgen award in Germany, the Rieder Gold Medal. This is the second English edition, and the book is familiar to all interested in radiography. There is little to add to other favourable reviews, beyond commenting on the wealth of detail it contains. Too high commendation cannot be given to the plan of describing first the normal and then tracing the various early changes produced by disease. It is also refreshing to note the use made of line drawings in supplementing and even replacing reproductions of skiagrams themselves.

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The book will be welcomed by those who wish a guide in radiological interpretation, and also by the more experienced who wish a book of reference containing such a body of carefully digested, clearly presented facts.

Aphasia. T. Weisenberg, M.D. and K. E. McBride, Ph.D. 634 pages. Price $5.00. Commonwealth Fund, New York, Oxford University Press, London, 1935.

This splendid volume, submitted for publication but a few weeks prior to the decease of the senior author, is the result of several years of detailed research by the late Dr. Theodore Weisenberg and his associates. The psychological aspect of the work was in charge of Dr. Katherine E. McBride. Conclusions are based upon the results of examination of 234 patients, of whom 167 formed three important groups; 62 showing definite aphasia; 21 with right-sided lesions without aphasia, and 85 selected from the surgical and orthopædic wards used as control cases.

In the first 118 pages the authors review the literature extensively, discussing the various theories advanced on the subject. Two chapters describe the types of patient studied in the research and the methods of examination employed. One chapter is devoted to a discussion of classification. The authors group their cases into (1) a predominantly expressive group; (2) a predominantly receptive group; (3) an expressive-receptive group and (4) an amnesic group. Each group is considered in turn with numerous exemplary cases adequately investigated. A short chapter is given over to a study of aphasia in cases with an expanding brain lesion. Separate chapters are devoted to the study of the 22 cases of right cerebral lesion without aphasia compared with the specially selected normal control cases and also with apraxia and agnosia. Important chapters are devoted to a study of the course of the aphasic disorders, re-education, and the psychological changes in aphasia. Three short chapters summarize the authors' opinions upon the question of localization from the present series, the concepts of aphasia, apraxia and agnosia, with a general conclusion. A bibliography of the more important contributions is given.

This is a conscientious and masterly research upon a carefully selected and well controlled series of cases and should be of value to all who are interested in the neurological and psychological aspect of aphasia.

Fracastor, Syphilis or the French Disease. A Poem in Latin Hexameters by Girolamo Fracastoro. Translated by Heneage Wynne-Finch, M.A., and an introduction by J. J. Abraham, C.B.E., D.S.O., M.A., M.D.(Dub.), F.R.C.S. 253 pages, illustrated. Price 10/6 net. William Heinemann, London; Macmillan, Toronto, 1935.

That physicians and scholars are interested in Fracastorius and his poem *Syphilis sive Morbus Gallicus* is evidenced in the fact that there are ninety known editions of the poem separately published, in anthologies and in editions of Fracastor's collected works. Written in Latin and published in Verona in 1531, the first Italian translation appeared 200 years later, but in the meantime there were five editions in English, the first in 1686. French, German, Spanish and Portuguese translations have also been published.

There had been two descriptive poems preceding Fracastor's, the better known being the Spanish of Francisco Lopez de Villalobos published in Salamanca in 1498. In the first and second books of the poem Fracastor describes the disease, its epidemic form, and its treatment with mercury and guaiacum. The third book tells the story of the shepherd Syphilus who was struck down by the disease syphilis as a punishment for neglecting the worship of Apollo. The poem has received high praise from both his contemporaries and from modern students of Latin verse for its beauty of diction, its singular felicity of style, the Virgilian rhythm and cadence, and the admirable use and variation of the cæsura, while in humour Fracastor far excels Virgil.

The present translator has endeavoured to render Fracastor's meaning accurately and at the same time preserve the elegance and poetic charm of the poem in his flowing prose. The Latin and English appear on opposite pages, allowing the student constant reference to the original. One of the valuable features of the appendix to Book iii is the discussion of the origin of the name Syphilus chosen for the shepherd of the poem. Another is the extended reference to the subject of syphilis in Fracastor's *De Contagione.* This is an excellent clinical description of the disease and its treatment at the time, and includes Fracastor's discussion of the still unsettled question as to the American origin of the disease.

Dr. Abraham in his introduction, which is both historical and biographical, expresses the opinion that the name and reputation of Fracastor have survived because he invented the word "syphilis", "and his memory would now have been almost forgotten had he not played an active part in the early history of the disease to which he gave its permanent name". But the translator does not agree with this, for he says "the author's fame is far from being based on this work alone" which would seem to be the general opinion of writers of medical history today. Fracastor was an astronomer, geographer, mathematician, and botanist, as well as a poet and physician. He wrote the first description of typhus fever, propounded the theory of infective particles in epidemic disease, was ahead of his time in geology, suggested rectilinear maps twenty years before Mercator published his, did much to improve the charts used by early navigators, and used double lenses for astronomical study before Galileo.

Mentality and the Criminal Law. O. C. M. Davis, M.D., D.Sc., Head of Department of Forensic Medicine, University of Bristol, and of the Middle Temple, Barrister-at-Law, and F. A. Wilshire, of the Middle Temple, Barrister-at-Law. 168 pages. Price $1.50. John Wright & Sons, Bristol, Macmillan, Toronto, 1935.

In the words of the introduction, "The object of this small book is to present in as concise a manner as possible the salient points connected with the law of England regarding the commission of criminal offences by mentally disordered persons." It is a book directed perhaps to the lawyer, and particularly the English lawyer, rather than to the medical practitioner. The authors, not attempting a criminological study, have not considered those sociological aspects of the problem that have been receiving increasing attention of recent years. They have limited themselves to presenting the law of England as it relates at this moment to such topics as "Mind", "Insanity", "Mens Rea and Intent", "Drunkenness", "Irresistible Impulse", "Insanity from the Legal Point of View" and so on. Within these limits the book is clear, neat and well done. As setting forth the legal aspects of the problems raised by such topics, it should be of value to the medical man who is called upon to give evidence on any one of them in court.

BOOKS RECEIVED

Growing Superior Children. I. N. Kugelmass, M.D., Ph.D., Sc.D., Attending Pædiatrician, Broach Street Hospital, French Hospital, and Heckscher Institute, New York. 568 pages, illustrated. Price $3.50. Appleton-Century, New York and London, 1935.

School Education in Hygiene and Sex. G. O. Barber, M.B., Medical Officer, Felsted School. 71 pages. Price 2/6 net. W. Heffer & Sons, Cambridge, 1936.

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Brain Preparations. J. Wilh. Hultkrantz. Tr. from first German edition by H. J. Wilkinson, Professor of Anatomy, University of Adelaide, Australia. 48 pages. Price $3.00. William Heinemann, London, 1935.

The Patient and the Weather. Vol. 1, Part 1. **The Footprint of Asclepius.** William F. Petersen, M.D. 127 pages. Price $3.75. Edwards Bros., Ann Arbor, 1935.

Common Skin Diseases. A. C. Roxburgh, M.A., M.D., B.Ch., F.R.C.P., Physician in Charge of Skin Department, St. Bartholomew's Hospital. Third edition, 377 pages, illustrated. Price 15s. net. H. K. Lewis, London, 1935.

The Osteopathic Lesion. George Macdonald, M.B., Ch.B., D.O., and W. Hargrave-Wilson, D.O. 141 pages. Price $2.25. Wm. Heinemann, London; Macmillan Co., Toronto, 1935.

Tumours of the Female Pelvic Organs. J. V. Meigs, A.B., M.D., F.A.C.S., Instructor in Surgery, Harvard Medical School. 533 pages, illustrated. Price $7.20. Macmillan Co., New York, 1934.

New Pathways for Children with Cerebral Palsy. Gladys G. Rogers, Director of Robin Hood's Barn, and L. C. Thomas, Director of Therapeutics, Robin Hood's Barn, Ascultney, Vt. 167 pages. Price $3.00. Macmillan Co., New York, 1935.

Applications Pratiques de la Transfusion Sanguine. R. Moline, interne des hôpitaux de Paris. 60 pages. Price 10Fr. J.-B. Baillière et Fils, Paris, 1936.

Transactions of the American Association of Genito-Urinary Surgeons. Vol. 28. 428 pages, illustrated. Bruce Publishing Co., Saint Paul and Minneapolis, 1935.

Kolloid-Fibel für Mediziner. Raphael Ed. Liesegang, Institut für Physikalische, Grundlagen der Medizin, Frankfurt. 33 pages. Price RM 1. Theodor Steinkopff, Dresden and Liepzig, 1936.

Endokrine Krankheiten. Vol I, Medizinische Praxis Series. Hans Curschmann, Universitätsprofessor, Rostock. 144 pages. Price RM8. Theodor Steinkopff, Dresden and Leipzig, 1936.

The Hospital Yearbook. 14th edition, 505 pages. Price $2.50. Modern Hospital Publishing Co., Chicago, 1935.

The Brain as an Organ. Frederic Wertham, M.D. and Florence Wertham. 538 pages, 168 plates. Price $9.00. Macmillan Co., New York, and Toronto, 1934.

The Tuberculin Handbook. H. Sutherland, M.D., Hon. Physician to Queen Alexandra Sanatorium Fund. 98 pages. Price $2.50. Oxford University Press, London; McAinsh, Toronto, 1936.

Zweite Internationale Kropfkonferenz, Berne, August 10-12, 1933. Dr. Otto Stiner. 698 pages, illustrated. Price, Swiss Fr. 25. Hans Huber, Bern, 1935.

International Clinics. By various authors. Vol. 1, forty-sixth series. 314 pages, illustrated. Price $3.00. J. B. Lippincott, Philadelphia, Montreal & London, 1936.

You Must Eat Meat. Max E. Jutte, M.D. 164 pages. Price $2.00. G. P. Putnam's Sons, New York, 1936.

Textbook of Medicine for Nurses. E. Noble Chamberlain, M.D., M.Sc., M.R.C.P., Assistant Physician, Royal Infirmary, Liverpool. Second edition, 444 pp., illustrated. Price $3.25. Oxford University Press, London; McAinsh & Co., Toronto, 1935.

Injury and Incapacity. H. E. Griffiths, M.D., F.R.C.S., Surgeon, Albert Dock Hospital. 270 pages. Price $3.75. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1935.

The Single Woman and Her Emotional Problems. Laura Hutton, B.A., M.R.C.S., L.R.C.P., Physician, Institute of Medical Psychology. 151 pages. Price $1.75. Baillière, Tindall & Cox, London; Macmillan, Toronto, 1935.

Examination of the Patient and Symptomatic Diagnosis. J. W. Murray, M.D. Second edition, 1219 pages, illustrated. Price $11.00. C. V. Mosby, St. Louis; McAinsh, Toronto, 1936.

Reminiscences. Agnes Hunt, D.B.E., R.R.C. 137 pages, illustrated. Price 5s. Wilding & Son. Shrewsbury, 1935.

A Short Ante-Natal and Post-Natal Handbook. R. K. Ford, M.D., M.M.S.A., St. Olave's Hospital, Rotherhithe. 141 pages. Price $1.80. Oxford University Press, London; McAinsh, Toronto, 1935.

Bacteriology in Relation to Clinical Medicine. M. N. De, M.B., M.R.C.P., Professor of Pathology, Medical College of Bengal, Calcutta, and K. D. Chatterjee, M.B., Medical Registrar, Medical College Hospitals, Calcutta. 599 pages, illustrated. Price 30s. net. Copies may be obtained from the authors.

British Health Resorts. Official handbook of British health resorts association. Edited by R. F. Fox, M.D., F.R.C.P., F.R.Met.S. 288 pages. Price 1s. net. J. & A. Churchill, London, 1936.

Time of Ovulation in Women. C. G. Hartman, Department of Embryology, Carnegie Institution of Washington. 226 pages, illustrated. Price $3.00. Williams & Wilkins, Baltimore, 1936.

Synopsis of Surgical Anatomy. A. L. McGregor, M.Ch., F.R.C.S., Lecturer on Surgical Anatomy, University of Witwatersrand. Third edition, 664 pages, illustrated. Price $5.25. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1936.

Diseases of Nose, Throat and Ear. Fourth edition edited by A. L. Turner, M.D., LL.D., F.R.C.S.E., Consulting Surgeon, Ear & Throat Department, Royal Infirmary, Edinburgh. 473 pages, illustrated. Price $6.00. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1936.

Ideal Birth. Th. H. van de Velde, M.D. 296 pages. Prize $3.00. Wm. Heinemann, London, 1935.

The Hygiene of the Change in Women. Isabel M. Hutton, M.D. 110 pages. Price $1.50. Wm. Heinemann, London; Macmillan, Toronto, 1936.

The Medical Annual, 1936. 621 pages, illustrated. Price $6.00. John Wright & Sons, Bristol; Macmillan, Toronto, 1936.

Synopsis of Diseases of Heart and Arteries. George R. Herrmann, M.D., Ph.D., Professor of Clinical Medicine, University of Texas. 344 pages, illustrated. Price $4.50. C. V. Mosby, St. Louis; McAinsh & Co., Toronto, 1936.

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Today many physicians find great convenience in the use of Argyrol tablets. These tablets are pure Argyrol, no binder being used. They not only insure accuracy, purity and genuineness but also save time because a fresh, potent solution is thus made available at a moment's notice in the doctor's office, in the operating room and at the bedside. In certain progressive hospitals the ward nurse makes a fresh solution as required instead of using the stock solution prepared in the pharmacy. Four tablets (6 grains each) dropped into a half-ounce of water make a 10 per cent solution in a few minutes; other strengths in proportion.

Argyrol is a unique compound, chemically unlike any other silver salt. Although it is the prototype of all mild silver proteins, none of the imitative preparations so classified contains silver in the same physical and chemical state as Argyrol; nor do they contain proteins of the same character.

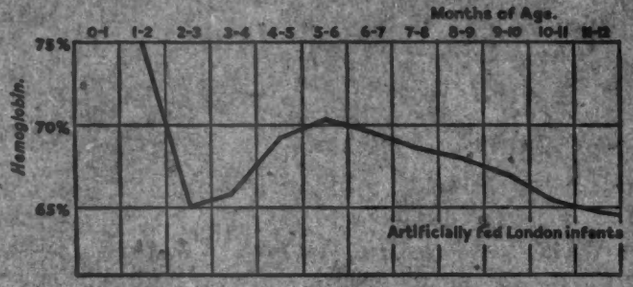
Then, too, it is interesting to note that among the U.S.P. mild silver proteins on the market there is a wide variation in hydrogen ion concentration from less than seven to more than eleven. This means that some products are very much more alkaline than others. This fact no doubt has much to do with the irritation noted by doctors when Argyrol substitutes are used in place of Argyrol. Argyrol's hydrogen ion concentration is always close to nine regardless of the solution used.

There is ONE . . . only ONE . . . ARGYROL, made only by

A. C. BARNES COMPANY, LIMITED
STE-THERESE, P.Q.

for 33 years sole makers of Argyrol and Ovoferrin. "Argyrol" is a registered trade-mark, the property of A. C. Barnes Co. Ltd.

Nutritional Anemia in Infants



Hemoglobin level in the blood of infants of various ages. Note fall in hemoglobin, which is closely parallel to that of diminishing iron reserve in liver of average infant. Chart adapted from Mackay. It is possible to increase significantly the iron intake of the bottle-fed from birth by feeding Dextri-Maltose With Vitamin B in the milk formula. After the third month Pablum offers substantial amounts of iron for both breast- and bottle-fed babies.

Reasons for Early Pablum Feedings

1. The iron stored in the infant's liver at birth is rapidly depleted during the first months of life. (Mackay,[1] Elvehjem.[2])

2. During this period the infant's diet contains very little iron—1.44 mg. per day from the average bottle formulae of 20 ounces, or possibly 1.7 mg. per day from 28 ounces of breast milk. (Holt.[3])

For these reasons, and also because of the low hemoglobin values so frequent among pregnant and nursing mothers (Coons,[4] Galloway[5]), the pediatric trend is constantly toward the addition of iron-containing foods at an earlier age, as early as the third or fourth month. (Blatt,[6] Glazier,[7] Lynch[8].)

The Choice of the Iron-Containing Food

1. Many foods reputed to be high in iron actually add very few milligrams to the diet because much of the iron is lost in cooking or because the amount fed is necessarily small or because the food has a high percentage of water. Strained spinach, for instance, contains only 1 to 1.4 mg. of iron per 100 gm. (Bridges.[9])

2. To be effective, food iron should be in soluble form. Some foods fairly high in total iron are low in soluble iron. (Summerfeldt.[10])

3. **Pablum is high both in total iron (30 mg. per 100 gm.) and soluble iron (7.8 mg. per 100 gm.) and can be fed in significant amounts without digestive upsets as early as the third month, before the initial store of iron in the liver is depleted. Pablum also forms an iron-valuable addition to the diet of pregnant and nursing mothers.**

Pablum (Mead's Cereal thoroughly cooked and dried) consists of wheatmeal, oatmeal, cornmeal, wheat embryo, brewers' yeast, alfalfa leaf, beef bone, iron salt and sodium chloride.

[1-10] Bibliography on request.

MEAD JOHNSON & CO. OF CANADA, LTD., Belleville, Ont.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons